Internet Investor Relations, Information Asymmetry and the Cost of Capital: Evidence from JSE Listed Companies

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Declaration

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GF Nel December 2016

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Abstract

In South Africa, King III compliance is a JSE listing requirement. Chapter 8 of the King III code states that transparent and effective communication with stakeholders is essential for building and maintaining their trust and confidence. Investors and creditors, as important sources of finance, are two important stakeholders to companies.

Investor relations is the field that is concerned with the management of relationships between companies and investors. Financial communication is an important component of investor relations, and entails much more than mere financial statements. While South Africa has recently been ranked number one by the World Economic Forum 2015–2016 Global Competitiveness Index for the strength of its auditing and reporting standards for the sixth consecutive year, the quality of investor relations, as a wider concept, is largely un-researched in South Africa.

As opposed to financial statements which content is regulated by various standards, acts and codes, the investor relations activity is not regulated and companies have a wide variety of investor relations communication channels from which to choose. This dissertation is concerned with one of these channels, namely the corporate website.

The purpose of this study was to investigate the quality of the corporate website for investor relations purposes in South Africa, to establish the determinants thereof, and to establish whether the use thereof has any effect on the level of information asymmetry and the cost of capital. Theoretically, a well-developed Internet investor relations strategy will increase company visibility, according to the investor recognition hypothesis of Merton (1987). An increased visibility may increase liquidity and, according to economic theory, an increased liquidity is linked to the cost of capital through information asymmetry.

Considerable research has been done on the relationship between disclosure and both information asymmetry and the cost of capital. The vast majority of empirical research to date has relied on either the use of an indirect proxy for disclosure (e.g. analyst ratings) or a measurement of annual report voluntary disclosures. Prior research on Internet investor relations is limited.

Although the weight of empirical evidence points to a negative association between disclosure/investor relations and both information asymmetry and the cost of capital, literature is far from reaching a consensus; and numerous studies have found no or even positive associations. Empirical research in these areas has further favoured the use of developed country data and this is the first study that endeavours to examine the determinants of Internet investor relations, as well as the effect thereof on information asymmetry and the cost of capital in the South African context.

In the absence of a readily available and comprehensive measurement instrument, the first objective of this study was to develop a measurement instrument that could be used to measure the extent of Internet investor relations. The measurement instrument was developed using: (1) the best practice corporate website guidelines as published by the Investor Relations Society, (2) an extensive

literature review to mitigate the risk of omitting important variables and to improve comparability with previous studies, and (3) a pilot study to evaluate the practicality of measuring the attributes as selected. The result was a measurement instrument that consisted of 346 attributes.

Stratified random sampling with proportional allocation (using JSE industry membership) was used to select a sample of 85 JSE-listed companies. The corporate websites of these companies were assessed from March to September 2015. No research assistants were used and all assessments were done by one researcher (the writer of this dissertation).

The scores of individual attributes were added together to calculate a disclosure score per company. Although the majority of attributes were measured as either available (1) or absent (0), 50 attributes were measured as partially available (0.5), based on the breadth and depth of content available. Non-functional and unuseful links were assessed as absent (0). Outdated information was assessed as either partially available (0.5) or absent (0). Where information was available, but as a result of factors such as poor layout, inconsistencies and incompleteness was not fully useful, the attributes were assessed as partially available (0.5).

Although there was some subjectivity involved in such a methodology, the dissertation promotes the argument that such an approach was important to ensure that the quality of Internet investor relations would be measured, and not merely the quantity. No other study in the literature reviewed for this dissertation has assessed attributes as being only partially available based on the amount of information, and timeliness and usability concerns.

Overall, the results showed that the majority of companies did not use corporate websites optimally to communicate with investors. Suggestions have been made on how companies can improve their Internet investor relations. To establish the determinants of Internet investor relations, numerous company characteristics that could explain variations in Internet investor relations levels were identified from the literature review. Using stepwise regression, it was found that company size, leverage, the audit firm used, industry membership, free float, and dual-listing status explained 69% of the total variation in Internet investor relations.

As information asymmetry is not directly observable, this dissertation used five alternative proxies to estimate information asymmetry: the bid-ask spread, price impact, share price volatility, share turnover, and analyst following. In theory, the first three proxies are positively related to information asymmetry and the last two, negatively. The level of Internet investor relations was found to be statistically significantly and negatively related to the bid-ask spread and price impact, and positively related to share turnover and analyst following. Based on theory, the observed relationships – two negative; two positive – therefore all points towards a negative relationship between Internet investor relations and information asymmetry.

By identifying additional variables that were used in literature to explain variations in information asymmetry and applying stepwise regression, this study constructed regression models that

explained 51%, 54%, 90% and 91% of the variations in the share turnover, analyst following, price impact and bid-ask spread, respectively. The activity of Internet investor relations was found to be non-significant in explaining the share price volatility information asymmetry proxy.

When examining the association between Internet investor relations and the cost of debt, it was found that Internet investor relations was statistically significantly and negatively related to the cost of debt. The cost of debt was measured as the interest expense for the year, scaled by the average interest-bearing liabilities. Although the explanatory power of this regression model was very low (adjusted R^2 of 14%), the adjusted R^2 compared favourably with previous disclosure–cost of debt studies. Guidara, Khlif and Jarboui (2014), for example, examined the relationship between annual report voluntary disclosure and the cost of debt using South African data and reported an adjusted R^2 of 8%.

Owing to the non-availability of analyst forecast data for the study sample, *ex ante* cost of equity estimate methods could not be used. To estimate the cost of equity, this study thus used the capital asset pricing model. PwC (2015) valuation surveys have shown that the capital asset pricing model is the most often used method in cost of equity calculations in southern Africa. Criticism against the use of the capital asset pricing model was carefully considered in this dissertation and an adjustment was made to the cost of equity of smaller companies (i.e. companies with a market capitalisation of less than R2 000 million). These adjustments were based on current valuation practice in South Africa.

This study found that the level of Internet investor relations was statistically significantly and negatively related to the cost of equity. Together with share price, leverage, the market-to-book ratio and industry membership, the level of Internet investor relations was found to explain 59% of variations in the cost of equity. In a separate analysis of the cost of equity, before any adjustments to the smaller companies, the level of Internet investor relations was, however, found to be non-significantly related.

Cost of capital – also named the weighted average cost of capital (WACC) – is the weighted average cost of equity and cost of debt. Irrespective of how the weightings were calculated (i.e. by means of book value or market value) or whether the cost of equity adjustments discussed in the two paragraphs above were made or not, the level of Internet investor relations was found to be statistically significantly and negatively related to the cost of capital.

Overall, the results of this study suggested that companies may potentially benefit from a well-developed Internet investor relations strategy through decreased information asymmetry and cost of capital. Since disclosure studies are often criticised for not testing or controlling for endogeneity, the Wu-Hausman test statistic was applied, and duly confirmed the absence of endogeneity in all regression models.

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List of acronyms and abbreviations

AICPA	American Institute of Certified Public Accountants
AIM	Alternative Investment Market
AIMR	Association for Investment Management and Research
ASIC	Australian Securities and investment Commission
AuASB	Auditing and Assurance Standards Board (Australia)
BBBEE	Broad-based black economic empowerment
CAPM	Capital asset pricing model
CIFAR	Centre for International Financial Analysis and Research
CIMA	Chartered Institute of Management Accountants
CSD	Central Securities Depository
EDGAR	Electronic Data Gathering, Analysis and Retrieval System
EY	Ernst & Young
FAF	Financial Analyst Federation
FASB	Financial Accounting Standards Board
GAAP	Generally Accepted Accounting Principles
GRI	Global Reporting Initiative
HTML	Hypertext Markup Language
IASB	International Accounting Standards Board
IASC	International Accounting Standards Committee
IFAC	International Federation of Accountants
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IIR	Internet investor relations
IoDSA	Institute of Directors in South Africa
IR	Investor relations
IRC	Integrated Reporting Committee
IRS	Investor Relations Society
JSE	Johannesburg Stock Exchange

KPMG	Klynveld Peat Marwick Goerdeler
LSE	London Stock Exchange
NASDAQ	National Association of Securities Dealers Automated Quotations
NYSE	New York Stock Exchange
PDF	Portable Document Format
PwC	PricewaterhouseCoopers
RSA	Republic of South Africa
SAICA	South African Institute of Chartered Accountants
SEC	Securities and Exchange Commission
SEDAR	System for Electronic Document Analysis and Retrieval
STRATE	Share transactions totally electronic
URL	Uniform Resource Locator
UK	United Kingdom
US	United States of America
WWW	World Wide Web
XBRL	eXtensible Business Reporting Language

CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Investors require information for the evaluation of share investments. Such information can be obtained directly from the company or indirectly through information intermediaries (e.g. sell-side research analysts, share brokers and business news publications). Various terms are used in literature and by the financial community to describe the communication of information from companies to investors, such as disclosure, financial reporting and investor relations.

According to definitions.net,[1] the term investor relations (IR) implies:

> a strategic management responsibility that is capable of integrating finance, communication, marketing and securities law to enable the most effective two-way communication between a company, the financial community, and other constituencies, which ultimately contributes to a company's securities achieving fair valuation.

The Investor Relations Society[2] defines investor relations as:

> the management of the relationship between a company with publicly traded securities and the holders or potential holders of such securities.

Marston (1996: 477) defined investor relations as the link between a company and the financial community in terms of which information is provided to the financial community for evaluating the company. Investor relations is also often referred to as a strategic corporate marketing activity (Brown, 1994; Dolphin, 2004).

According to these definitions, investor relations therefore involves all information types, for example both mandatory and voluntary,[3] financial and non-financial, and qualitative and quantitative, as well as shareholder services to facilitate relationship management and/or strategic marketing. Investor relations communication channels available to companies include, but are not limited to, annual and interim reports, presentations, media releases, face-to-face meetings, corporate websites and social media, such as Twitter, Facebook and YouTube.

According to the Investor Relations Society (2013a), the annual report has been the primary source of authoritative information about a company in the past, but it now needs to complement and supplement other information sources. The development of the World Wide Web (WWW)[4] has introduced several new and innovative ways for companies to communicate with investors, such as

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[1] Online resource for definitions and translations, available at www.definitions.net.
[2] The Investor Relations Society (IRS) is a British professional body for investor relations practitioners.
[3] Mandatory disclosure is primarily supplied in the annual reports of companies according to various rules and regulations (e.g. IFRS). Voluntary disclosure is defined as additional disclosure not required by rules and regulations.
[4] The terms Internet and WWW are used interchangeably in this dissertation. The Internet and WWW refer to a wide collection of web resources such as corporate websites, Twitter and e-mail.

corporate websites, social media (e.g. Twitter, Facebook and blogs) and electronic filing systems (e.g. Electronic Data Gathering, Analysis and Retrieval System (EDGAR) and System for Electronic Document Analysis and Retrieval (SEDAR) in the US and Canada respectively).

According to Jones (2009: 1.3)[5], the rapid increase of information channels has driven users closer to sources directly controlled by the company, such as corporate websites. Alternative sources are often perceived as less reliable and potentially biased.

Before the research problem, questions, objectives, methodology and limitations of this dissertation can be discussed, five questions need to be considered. Firstly, do companies use the corporate website as investor relations communication channel? Secondly, how do companies use corporate websites? Thirdly, do investors use corporate websites? Fourthly, what are the advantages in using a corporate website? And, fifthly, what are the disadvantages in using a corporate website? In pondering the last two questions, the uniqueness of using corporate websites as opposed to conventional, non-electronic communication channels is discussed.

1.2 THE CORPORATE WEBSITE AS INVESTOR RELATIONS COMMUNICATION CHANNEL

1.2.1 Do companies use the corporate website as communication channel?

Empirical findings by the Financial Accounting Standards Board (FASB, 2000) and Allam and Lymer (2003) have shown that nearly all the largest listed companies in developed countries have corporate websites with dedicated investor relations sections. Similar results were documented for South Africa by Venter (2002), Loxton (2003), Barac (2004), Nel and Baard (2007), and Esterhuyse and Wingard (2016). On the contrary, studies performed in other developing countries reported that a significant number of listed companies in these countries do not have websites or do not supply any financial information on their websites.[6]

It is assumed that given the growth in Internet accessibility, accompanied by decreased development and maintenance costs in the last decade, all Johannesburg Stock Exchange (JSE)-listed companies have corporate websites with at least some information aimed at investors.[7]

1.2.2 How do companies use corporate websites?

Investor relations, public relations, employment opportunities and 'about us' are referred to by some as the "big four" components of corporate websites (Investor Relations Marketing, 2006). Corporate websites are, among other things, used for advertising (e.g. to promote brand development or to

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[5] Jones based his research on interviews with fund managers and analysts.
[6] Mohammed, Oyelere and Al-Busaidi (2009: 56) reported that only 84 of the 142 listed companies in Oman have a working website, with only 31 of the 84 engaging in Internet reporting. Baard and Nel (2011: 1) studied the top 40 companies in Egypt, Kenya, Morocco, Nigeria and Tunisia and report that only 162 of the top 200 in these countries have a working website, with only 130 of the 162 engaging in Internet reporting.
[7] This assumption was tested with the selection of the sample, as discussed in Section 4.2, and it was found that five JSE-listed companies had no working corporate website at that time.

enhance the corporate image), e-commerce and to enhance stakeholder relationships (e.g. with employees, suppliers, general public, government and shareholders (investors)). It is therefore important to note that corporate websites are used for a variety of different reasons by companies, and almost never for IR only.[8]

Although JSE-listed companies are mandated by International Financial Reporting Standards (IFRS), the Companies Act (RSA, 2008), Johannesburg Stock Exchange (JSE) listing requirements and the King III corporate governance code[9] to communicate specific information items (by way of the integrated annual report) to investors, the decision to engage or to use the corporate website as IR communication channel is voluntary (companies may for example elect to distribute only hard copy integrated annual reports to eligible shareholders). Applicable sections of the regulatory environment are discussed in Chapter 2.

Despite the fact that various attempts have been made to regulate investor communication via corporate websites, such as by the Commission des Operations de Bourse 1999, the International Accounting Standards Committee (IASC) 1999, the International Accounting Standards Board (IASB) 1999, the Financial Accounting Standards Board (FASB) 2000, Securities and Exchange Commission (SEC) 2001, Australian Securities and Investment Commission (ASIC) 2004, Web Trust 2006 and the Auditing and Assurance Standards Board (Australia) (AuASB) 2006, to date no international standard or its equivalent exists in the South African context.[10]

Lymer, Debreceny, Gray and Rahman (1999: 48) described three stages of corporate website reporting. At Stage one, the hard copy annual report is merely duplicated in “electronic paper”, e.g. PDF.[11] Stage two sees hard copy reports converted into HTML.[12] DeStefano and LeFevre (2005: 1616-1617) defined hypertext as a collection of documents containing links that allow readers to move from one chunk of text to another. At Stage three, enhancements that cannot be incorporated into printed documents, such as eXtensible Business Reporting Language (XBRL),[13] are used.

Similar to Lymer *et al.* (1999), Hedlin (1999) also proposed a three-stage model. At Stage one, companies establish a web presence by introducing a corporate website. During Stage two, companies begin to use their corporate website to communicate financial information, and finally,

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[8] It should further be noted that companies’ use of the Internet is not limited to corporate websites only, but that companies also use other Internet technologies such as Twitter and YouTube to communicate with investors. As discussed later in this Chapter, this study is limited to an examination of the corporate website as IR communication channel. Some evidence of companies’ use of these alternative Internet communication channels is however briefly discussed in Section 4.3.6.2.
[9] King III is a governance compliance framework issued by the Institute of Directors in South Africa (IoDSA). Compliance therewith is a Johannesburg Stock Exchange (JSE) listing requirement. King IV is currently in progress.
[10] The only noteworthy exceptions are the minimum website disclosure requirements of the London Stock Exchange (LSE) for companies listed on the Alternative Investment Market (AIM) and the European transparency directive (2004/109/CE).
[11] Portable Document Format (PDF).
[12] Hypertext Markup Language (HTML) is the standard markup language used to create web pages.
[13] XBRL is a standards-based way to define, communicate and exchange business information (such as annual reports). XBRL data are computer-readable only. Research by Pinsker and Li (2008) and Yoon, Zo and Ciganek (2011), both cited by Gajewski and Li (2015), suggested that XRBL improves financial transparency and reduces information asymmetry in the capital markets. None of the companies examined in this study referred to XBRL on their corporate websites.

during Stage 3, companies begin to take advantage of the unique features and possibilities of the medium. Loxton (2003) and Esterhuyse and Wingard (2016) used the Hedlin (1999) three-stage model to describe the stage of Internet investor relations of JSE-listed companies. According to Loxton (2003), “most companies in SA appear to be in the second stage”.

Thirteen years later, Esterhuyse and Wingard (2016: 215) stated that “instead of moving towards stage III (HTML, video and audio) of Hedlin’s model (1999), JSE-listed companies still seem to find themselves in stage II (paper-equivalent PDF’s)”. Although it may seem that JSE-listed companies have shown no improvement since the Loxton (2003) study, it should be noted that Loxton (2003) surveyed only the largest 40 companies, whereas Esterhuyse and Wingard (2016) assessed 205 JSE-listed companies.

The use of corporate websites for financial reporting can also be described as a two-stage decision process (Trabelsi, Labelle & Dumontier, 2008). The first decision is to use the corporate website as communication medium to broaden access to the company’s financial reporting, followed by a second deliberate managerial decision to communicate additional information rather than merely to reproduce conventional financial reporting content already available.

Serrano-Cinca, Fuertes-Callén and Gutiérrez-Nieto (2007) used seven attributes to measure the stage of development of the online reporting of banks in Spain:

- Opaque: Mostly legal and contact information. Only isolated, if any, financial information.
- Bare: Only summary financial information, e.g. highlights.
- Paper lovers: PDF annual reports.
- HTML accounts: Annual reports in PDF, and a specialised financial information section.
- Internet financial portal: Continuous reporting, e.g. updated news.
- Multimedia: Advanced technological development and alternative ways of displaying and downloading information, e.g. webcasts, Excel downloads and PowerPoint presentations.
- Web 2.0.: Dialogue and interaction with users, e.g. RSS and blogs.

Prior studies on the use of corporate websites for investor communications (FASB, 2000: 30) further often distinguished between content and presentation, with content referring to all financial and non-financial information and presentation to the use of presentation technologies to enhance the information. Marston and Polei (2004: 297) argued that although investors are mainly interested in the extent to which information has been provided (i.e. content), they also need to find this information as quickly and easily as possible (via clear presentation).

Four quadrants, as presented in Figure 1.1, were identified on the basis of these two basic dimensions of reporting (namely content and presentation).

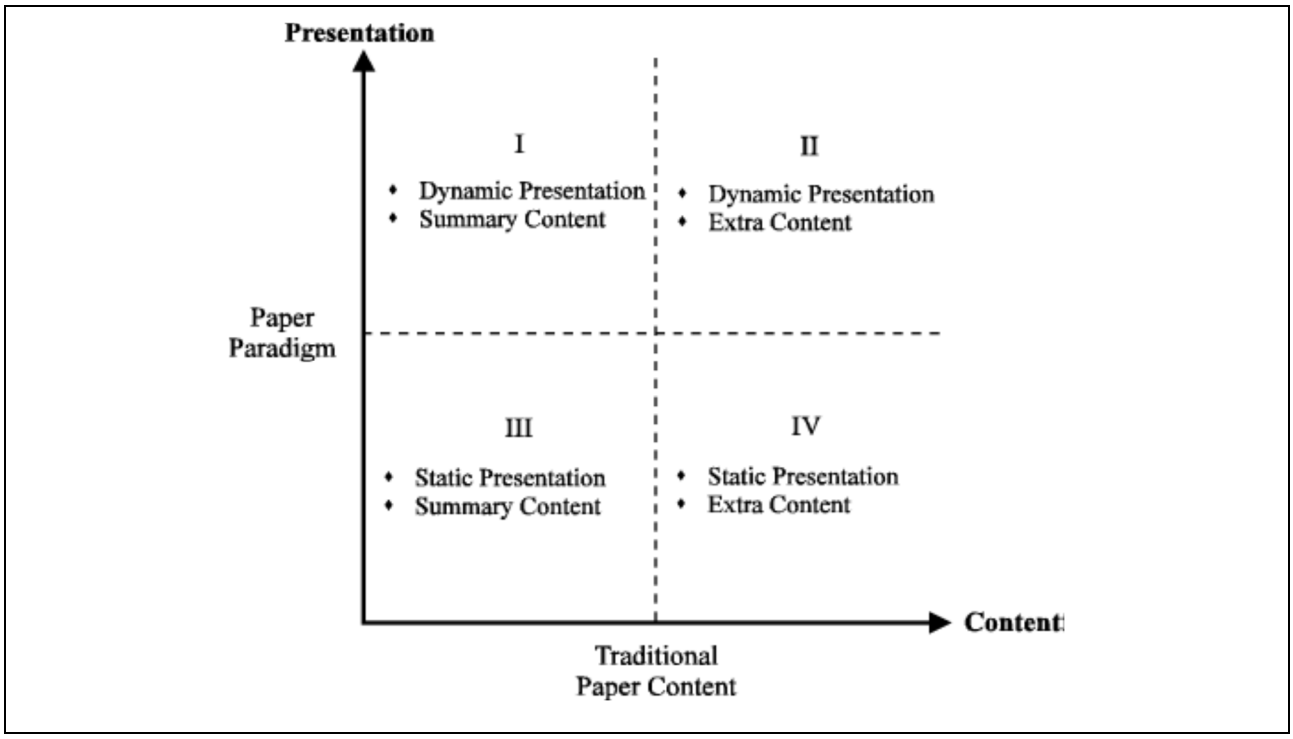

Figure 1.1: The two dimensions of web design attributes: presentation and content

Source: FASB, 2000: 30

If all companies were to use corporate websites merely as an alternative source of information for investors (as described in Quadrant III of Figure 1.1 and stage 1 as referred to by Lymer *et al*., 1999 (see pages 3-4 above)) and thus disseminate no new information and use no presentation technologies to enhance the usefulness of the information (as described in Quadrant II and stage 3 as referred to by Lymer *et al*., 1999), the usefulness of corporate websites as communication channels to investors would be extremely limited.

Trabelsi *et al.* (2008: 120) found that approximately 50% of all Canadian companies communicated information via their corporate websites that was not available via their annual reports. Trabelsi *et al.* (2008) distinguished between incremental and disaggregated information, defining incremental information[14] as voluntary information that was not disclosed in the annual report, and disaggregated information as the further explanation of information already disclosed in the annual report.

Striukova, Unerman and Guthrie (2008: 308-310) argued that corporate websites have a distinct role to play, as companies use different information sources (e.g. annual reports and websites) purposefully in order to communicate different balances and types of information. They specifically found that the corporate website was the best source for intellectual capital disclosure (36%), followed by the annual report (32%) and the annual review (12%).

[14] Trabelsi *et al.* (2008) categorised incremental information in four categories: 1) background information; 2) management forecasts; 3) intangible assets; and 4) social and environmental issues.

Aerts, Cormier and Magnan (2007: 1320) found that, while web-based corporate performance disclosure[15] attracted financial analysts in northern America (Canada and US) and therefore possibly conveyed new information to them, financial analysts in continental Europe (Belgium, Netherlands, Germany and France) were not attracted by such disclosures. They subsequently argued that companies in continental Europe used other communication channels to make the same disclosures to their shareholders.

Cormier, Ledoux and Magnan (2009: 3) inferred from their study that the use of corporate websites was not purely symbolic or for impression management, but rather represented an attempt by management to communicate value-added information to shareholders.

Matherly and Burton (2005) did an assessment of the types of information that companies disclose on their corporate websites.[16] They found that although companies disclosed 51% of convenience items (defined as items that are also available elsewhere) and 49% of company background items (e.g. brands or products, locations and history), only 28%, 33% and 27% of business data,[17] forward-looking data[18] and intangible items[19] as measured, respectively, were disclosed on their corporate websites.

The FASB (2000: 40) distinguished between three distinct company goals for electronic business[20] reporting: the complementary group, the substitute group and the innovative group. The complementary group publishes only standard financial reports (e.g. the annual report), press releases and limited investor information (e.g. the share price). The substitute group publishes the same information as the complementary group, with some additional information such as share price and dividend history, and proactively encourages the use of corporate websites as a substitute for the distribution of printed material by the company. The innovative group publishes the widest range of information, which may include conference calls and management presentations, proactively maximising the company's web capabilities to expand its audience, generate more usage and provide information in alternative formats.

Holm (2000: 14) suggested four possible categories that could be used to categorise companies' efforts to communicate with investors via corporate websites: functional, promotional, communicational, and unstructured. The functional practice is where the annual and interim reports are presented under links with titles such as finance or economy. The promotional practice is where the main page provides a link to the latest annual report. The communicational practice is where all

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[15] Performance disclosure indicators were based on balanced scorecard literature and seven components were included: 1) financial, 2) corporate governance, 3) customer value, 4) human and intellectual capital, 5) production efficiency, 6) innovation, development and growth, and 7) social responsibility.
[16] A sample of 396 public companies (334 US and 62 foreign) was investigated. Their assessment was based on a 2001 FASB report with the title: Improving Business Reporting: Insights into Enhancing Voluntary Disclosures.
[17] Examples: historical growth, key risks and market share.
[18] Examples: future sales, future goals, industry trends and new products.
[19] Examples: customer testimonials, list of major customers, list of suppliers, details of alliances, and research and development activities.
[20] Used as a synonym for corporate websites.

corporate information is presented in accordance with a conscious and consistent communication strategy, where the potential and existing investors are identified specifically (often under a link with the title “investor relations”). The unstructured practice is where the financial information is scattered all over the website with no obvious structure.

Significant cross-sectional variations in the use of corporate websites as IR communication channel is assumed given the voluntary nature of corporate websites as IR communication channel and the wide (and growing) variety of presentation technologies available to companies – coupled to the fact that companies will use corporate websites not only for IR, but also for other purposes (e.g. e-commerce).

1.2.3 Do investors use corporate websites?

Any individual with access to the Internet and with a basic knowledge regarding the use of search engines has access to corporate websites. Accordingly, users range from the naïve decision maker to the institutional investor and analyst. It is important to be aware that different types of investors use corporate websites and that they all have different requirements based on their investment objectives (e.g. short-term speculation or growth over a longer period of time).

A Securities and Exchange Commission (SEC) report (2008: 6) found that 55% of retail investors accessed investment information via the Internet. The majority of retail investors (51%) listed their financial advisor or broker, followed by the Internet (16%), as their main sources of investment information.

Wade and Forbes (2000: 9) found that up to 75% of institutional investors reviewed corporate websites before meeting with the management of a company. Loehnis (2007: 1) reported that approximately two-thirds of the fund managers that were interviewed in a study stated that the quality of corporate websites influenced their attitude towards a company as an investment. In a UK study on the use of corporate websites,[21] Beattie and Pratt (2003) found that a significant percentage of survey participants used corporate websites “almost daily” as information source: private shareholders (41%), investment analysts (86%), fund managers (92%) and corporate lenders (68%).

Research by Hodge and Pronk (2006) provided evidence that corporate websites have also become an important source of information for information intermediaries such as financial analysts. A case study of the Royal Phillips Electronics website has documented that financial analysts represented 12% of website traffic over a four-week period after quarterly earnings announcements (Hodge &

[21] Beattie and Pratt (2003) referred to corporate websites as “the Internet” in their study. In the questionnaire sent to their survey participants they made it clear that questions related only to “information provided using the Internet via corporate websites’. It should be noted that many of the earlier studies used the terms Internet and corporate websites interchangeably. Many well-known Internet applications today (e.g. Twitter, Facebook and YouTube) were only developed during the last 10 years (Butler, 2015).

Pronk, 2006: 278). In the same study, private shareholders represented 10.5%, institutional shareholders 3.2% and lenders 1% of the website traffic.

In 2009, the consultancy company Makinson Cowell repeated a 2007 study, and found that about 50% of participants felt that their usage of corporate websites had increased during the previous two years. The enhanced availability of information was the most common reason given for the increased usage, with a minority of participants attributing their increased use to changes in their own behaviour and preferences (Jones, 2009: 2.2).

FASB (2000: 42) reported that the majority of companies that track website usage agreed that their greatest use came from individual investors and shareholders. They further reported that although companies in the innovative group attracted more interest from analysts and large institutional investors compared to companies in the complementary and substitute groups,[22] they still considered individual investors as their biggest user group.

In a study in which institutional investors were asked why they did not use corporate websites, the following were given as reasons: reluctance to trust the technology, lack of confidence in their own technical ability, preference for existing information suppliers, and negative perceptions as to site navigation, quality and the timeliness of information available (Wade & Forbes, 2000: 7).

Therefore, although individual corporate websites may not always convey exclusive and new information, the widespread use of websites as an information source by both investors and information intermediaries has been well documented. Not only the quality of the information communicated, but also the presentation of the information (e.g. ease of navigation) will affect investors' perceptions of whether corporate websites provide a relevant, important and preferred incremental information source or merely a convenient alternative source.

1.2.4 What are the advantages in using a corporate website?

Compared to the more traditional media (e.g. hard copy annual reports), the corporate website as a communication medium has specific advantages for both companies and investors. For companies, it is more cost-effective, faster, more flexible in format, and more accessible to investors; while for investors, it may potentially be an easy, quick, cheap, complete, reliable and up-to-date source of information that is readily available. Smith and Pierce (2005: 51) listed the following as advantages for the website host: to tailor content to match user needs; to use multimedia communications to generate dynamic and responsive content; and to use artificial intelligence for possible interactive exchanges between preparers and users.

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[22] As discussed earlier in this chapter on page 6, the complementary group only publishes standard financial reports, press releases and investor information; the substitute group publishes the same information as the complementary group with some additional information (e.g. share price and dividend history); and the innovative group publishes the widest possible range of information in order to maximise its web capabilities to expand its audience and generate more usage.

According to Cormier *et al.* (2009: 4), web-specific attributes, such as dynamic information, real-time access and interactive capabilities, all contribute to the perceived superiority of corporate websites as the best platform for corporate communications. In addition, the use of a corporate website may decrease companies' dependence on information intermediaries.

According to the IASB conceptual framework for financial reporting (hereafter referred to as 'the Framework'), the objective of financial reporting is to provide financial information that will be useful[23] to existing and potential investors in making investment decisions (IASB, 2010: A27). The Framework specifically states that investors will also have to consult other sources in addition to financial reports, as financial reports do not and are not able to provide all the information that investors need (IASB, 2010: A28).

The Framework (IASB, 2010: A33) requires two fundamental qualitative characteristics (relevance and faithful presentation) that must be adhered to for financial information to be useful, and four enhancing qualitative characteristics that could further improve the usefulness of information (comparability, verifiability, timeliness and understandability).

Relevant information is information that is capable of making a difference in respect of decisions made by investors. For a faithful representation, three characteristics are required: completeness, neutrality and freedom from error. For information to be neutral there should be no bias in the selection of presentation of information.

Given the inherent advantages of corporate websites discussed above, this study suggests that the optimal use of the corporate website as IR communication channel may enhance the usefulness of information to investors. Litan and Wilson (2000) suggested that utilising Internet capabilities more efficiently should result in financial reporting that is forward-looking and which describes not only historical cost-based elements, but also provides a more accurate picture of the organisation's current and future prospects (as cited in Khan, 2006: 13).

Although the advantages of the corporate website as communication medium is common knowledge today given the exponential growth in the use of the Internet over the past two decades, this study assumes that, in view of the discussion in Section 1.2.2 above, not all companies fully utilise these advantages and thus for some these exist only as opportunities. Therefore this study henceforth refers only to potential advantages. As discussed in Section 1.2.5 below, many of these potential advantages (e.g. timeliness and navigation) may decrease the usability of corporate websites if not utilised effectively. For example, if only good news is published on corporate websites, the neutrality, and therefore the faithful presentation and usefulness of information, could be compromised.

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[23] The usefulness of information communicated via financial statements is often criticised. According to Lymer (1999: 289), dissatisfaction with corporate reporting activities and the regulation thereof dates back to the first attempt to regulate accounting.

1.2.5 What are the disadvantages in using a corporate website?

Although corporate websites can be used to enhance investor relations through additional content and the use of innovative presentation technologies, not all content and presentation technologies will benefit investors in the same way.

Notwithstanding the potential advantages discussed in Section 1.2.4 above, the following are often discussed in the literature as disadvantages, risks or challenges in the use of the corporate website as communication channel: outdated and incomplete information, disorientation, lack of clear boundaries, information or cognitive overload, absence of regulatory standards to standardise content, general information technology (IT) risks, high costs of developing and maintaining corporate websites, and the lack of assurance regarding the credibility of information.

- Outdated and incomplete information

Given the potential advantages discussed above and the widespread use of the corporate website as communication channel, users may have the reasonable expectation of timeliness and completeness. Hard copy reports (e.g. annual reports) are always dated and the reader of these reports will have a reasonable expectation that the bound document will include a pre-determined set of information (FASB, 2000: viii) (e.g. accounting notes and an audit report with an annual report). According to FASB (2000: viii), information provided on corporate websites does not have the same level of pre-determined completeness as hard copy reports and is not always the most current information available.

- Disorientation

Dillon, McKnight and Richardson (1990) stated that the problem of disorientation or "getting lost in hyperspace" arises from the need to know where one is in the network of hyperlinks, where one came from, and how to navigate to another place in the network. Conventional (i.e. hard copy) texts are primarily sequential in nature (i.e. arranged in a linear fashion) and, for example, have a table of contents with topics and page numbers, compared to corporate websites that are non-sequential with hundreds or thousands of links (Debreceny, Gray and Mock, 2001: 10).

Ghani, Laswad and Tooley (2011: 187) found that alternative digital formats (i.e. PDF, HTML and XBRL) do not significantly reduce functional fixation.[24] Hodge, Kennedy and Maines (2004: 687) reported results that support the notion that search-facilitating technologies aid financial statement users in finding and integrating information.

- Lack of clear boundaries

Although the use of hypertext is generally viewed as a presentation technology that enhances the usefulness of corporate website content, research by DeStefano and LeFevre (2007: 1616) and Dull,

[24] Functional fixation exists when users of financial statements either overlook information located outside the normal location or consider such information to be of lesser importance (e.g. a disclosure on the face of the financial statement or in a note to the financial statement) (Ghani, Laswad & Tooley, 2011: 187).

Graham and Baldwin (2003: 185) reported that this is not always the case. Kelton and Pennington (2012: 1178), on the other hand, reported that hyperlink users (specifically non-professional investors) expend less effort on the investment task than users of paper-based information. Hodge (2001: 675) reported evidence that suggests that companies can influence financial report users' perceptions by hyperlinking unaudited information to information in their audited financial statements.

Hodge (2001) and Trites (1999), as cited by Debreceny, Gray and Rahman (2002: 374), argued that the practice of hyperlinking audited financial statements to unaudited information leads investors to blend audited information with unaudited information by blurring the boundaries between them. Internet users assess the credibility of the unaudited information higher compared to users of hard copy information (Hodge, 2001). According to Fitzsimons and Shoaf (2000: 69), companies may face potential legal risk if they endorse unaudited information (e.g. forward-looking statements) without the necessary cautionary disclaimers.

Khadaroo (2005a: 66) described the risks associated with hyperlinks as follows:

> Links to third-party information, especially links to analysts' sites, may invite litigation. Without appropriate disclaimers, a company may inadvertently give visitors the impression that all information provided in other web sites to which the company's web site is linked is afforded the same level of accuracy and reliability. This is an issue clearly on the minds of those in the investor relations function.

- Information or cognitive overload

By default, all additional content and presentation technologies (e.g. hyperlinks and alternative digital formats) are positively viewed, but it is important to note that, as various studies suggest, this is not true in all circumstances. Given the low cost and relative ease with which already available information can be uploaded on corporate websites, information overload, as discussed by Lybaert (2002), could potentially compromise the usefulness of corporate websites. Debreceny *et al.* (2001: 10) were of the opinion that information presented in a complicated and unstructured way may lead to cognitive overload and also distract the reader.

According to Debreceny *et al.* (2001: 10), overload may result from the need of the user to make decisions as to which links to follow and which to abandon when there are a large number of choices. Debreceny *et al.* (2001: 11) further argued that, although companies may wish to create a comprehensive corporate website where sophisticated users, such as investment analysts, may find all required information, this may overload the smaller, average investor who just requires some basic information.

- Absence of regulatory standards to standardise content

It is the view of Khadaroo (2005a: 61) and Von Westarp, Stubenrath, Ordelheide, Buxmann and König (1999) that a major drawback of corporate website reporting is the absence of standardised

data, as companies use their discretion on what to disclose and what not to disclose on corporate websites.

Potential consequences of the absence of such standards include a cross-sectional variation between companies, industries and countries and an evolutionary, rather than a revolutionary, adoption of the corporate website as communication channel by companies. Previous research has documented cross-sectional variations (Aerts *et al*., 2007: 1320; Debreceny *et al*., 2002: 372; Beattie & Pratt, 2003; Lybaert, 2002: 212; Bollen, Hassink & Bozic, 2006; Matherly & Burton, 2005: 30; Marston & Polei, 2004: 299; Lymer *et al*., 1999; Wade & Forbes, 2000: 12; FASB, 2000: 19; Davey & Homkajohn, 2004: 211; Khan, 2006: 184; Khan, 2007: 37; Ettredge, Richardson & Scholz, 2002: 368) and a slow adoption of the corporate website as communication medium on the part of some companies (Baard & Nel, 2011; Davey & Homkajohn, 2004; Smith & Pierce, 2005).

Chatterjee and Hawkes (2008: 37) argued that such cross-sectional variation decreases the usability of corporate websites as it hinders the ability of users to access and compare information across companies. The immediate effect is that not all corporate websites would have the same level of potential benefits for investors.

- General information technology risks

The accounting and consulting firm, BerryDunn, lists the following as the top 10 information technology (IT) risks: an overreliance on security monitoring software, inadequate system logging, technology innovations that outpace security, outdated operating systems, lack of encryption, company data on user-owned mobile devices, IT ‘diplomatic immunity’ within the company, lack of management support, the inability to recruit qualified IT staff, and the segregation of duties (BerryDunn, 2014).

Although personal computers (i.e. laptops and desktops) were initially the preferred (and only) devices used for accessing corporate websites, it is generally expected that tablets and smartphones (mobile devices) will supersede personal computers in future. According to the International Data Corporation (IDC, 2014), vendors shipped 1 billion smartphones worldwide in 2013. Given the inherent differences between devices (e.g. screen resolution, screen size, input methods, viewing distance, processing capabilities and power consumption), this dissertation asserts that the tailor of content and presentation for each device may have to be considered given these differences.

- High costs of developing and maintaining corporate websites

It will only be financially feasible for a company to use a corporate website as IR communication channel if the expected benefits outweigh the expected costs. Expected benefits are, however, not easy to measure and a substantial portion of this dissertation has been devoted (see Chapters 6, 7 and 8) to the measurement of benefits. The cost–benefit analysis theory is also discussed in Chapter 2.

- Lack of assurance regarding the credibility of information

It is not clear whether the voluntary information contained on a corporate website is necessarily credible, given the conflicting incentives that companies have (Healy & Palepu, 2001: 425). Theories explaining voluntary disclosure are discussed in Chapter 2.

1.3 DEVELOPMENT OF THE RESEARCH PROBLEM

1.3.1 Background to the research problem

Accounting boards such as the Financial Accounting Standards Board (FASB)[25] and the International Accounting Standards Board (IASB),[26] professional auditing firms (PricewaterhouseCoopers, 2007: 7), and investor relations professionals (Agarwal, Taffler, Bellotti & Nash, 2016: 33) often claim decreased cost of capital[27] as one of the benefits of a well-developed and well-implemented disclosure policy. Such a negative association is also well supported by various analytical research studies (Leuz & Verrechia, 2000; Verrecchia, 2001; Easley & O'Hara, 2004; Lambert, Leuz & Verrecchia, 2009).

Others, however, have argued that enhanced disclosure will increase the cost of capital. The Financial Executives Institute (Berton, 1994) argued that increased disclosure levels would increase share price volatility and therefore risk, resulting in an increased cost of equity.

The FASB (2001) issued a report entitled the Business Reporting Research Project (BRRP). The objective of the BRRP was to help companies to improve their business reporting by providing evidence that many leading companies are making extensive voluntary disclosures and by listing examples of those disclosures. The basic premise underlying its report was that by improving disclosure companies could reduce their cost of capital (FASB, 2001: 16).

Tweedie, former chairman of the IASB, suggested that by providing "high quality, understandable and enforceable global accounting standards, the cost of capital is reduced because analysts and investors have a better understanding of companies' prospects" (Gow, Taylor & Verrecchia, 2011: 2). Foster, a former board member of the FASB, claimed that "more information always equates to less uncertainty, and people pay more for certainty" (Lambert, Leuz & Verrecchia, 2007: 386).

While Tweedie specifically had accounting standards and mandatory disclosure in mind, Foster on the other hand indirectly referred to voluntary disclosure. Gibbins, Richardson and Waterhouse

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[25] The FASB is responsible for the development of Generally Accepted Accounting Principles (GAAP) and is based in the US. The Jenkins Committee Report that was issued by the FASB in 1994 gave decreased levels of cost of equity capital as an important benefit of increased disclosure levels (Botosan, 1997: 324).

[26] The IASB is responsible for the development of International Financial Reporting Standards (IFRS) and is based in the UK. Although the IASB has its offices in London, its board represents a number of jurisdictions (for example, according to the IASB, 122 of 147 jurisdictions require IFRS standards for listed companies in their capital markets). According to paragraph QC37 of the IFRS Framework, useful information results in a lower cost of capital for the economy as a whole.

[27] Although cost of capital, or weighted average cost of capital, refers to the combined cost of equity and cost of debt weighted according to capital structure, literature is not always consistent and cost of equity, cost of capital, cost of finance and capital costs are sometimes used interchangeably.

(1990: 122) defined disclosure as any deliberate release of financial information, whether quantitative or qualitative, or via formal or informal communication channels.

Economic theory suggests two distinct routes in support of the hypothesis that disclosure could decrease cost of capital, the liquidity route and the estimation risk route (Botosan & Plumlee, 2002; Orens, Aerts & Cormier, 2010). The liquidity route leads to improved disclosure and increased liquidity, which will result in a decrease in the cost of capital either through reduced transaction costs or an increased demand. The estimation risk route is associated with the investors' assessments of the parameters of the expected return. Thus, improved quality of information enables investors to make more accurate estimates with less uncertainty about future cash flows and profitability.

According to Chang, D'Anna, Watson and Wee (2008: 378), the investor relations effect (i.e. the benefits thereof) on a company can be observed in two ways: increased visibility as predicted by Merton (1987) and increased disclosure resulting in capital markets effects, as documented by Easley and O'Hara (2004).

Ryder and Regester (1989), as cited by Brennan and Kelly (2000) stated that company investor relations focus on three principal aims: attain and retain the highest share price, create confidence in the capital market (e.g. ensure favourable cost of debt and terms of trade with large suppliers and customers) and influence the composition of the shareholder base (e.g. institutional, private or foreign investors).

Agarwal *et al.* (2016: 33) argued that an investment in investor relations is justified as it raises the company's profile with market participants, resulting in increased company values. Conventional finance theory, on the other hand, argues that there is no justification for expenditure that increases company visibility without providing new information relevant to investors in valuing the company in the perfect market setting assumption (Agarwal *et al.,* 2016: 45).

Supported by theory and various studies (Easley & O'Hara, 2004; Lambert *et al.,* 2009; Armstrong, Core, Taylor & Verrecchia, 2011[28]), an alternative research avenue to examining the direct relationship between disclosure and the cost of capital is to investigate the indirect relationship by examining the association between disclosure and information asymmetry (Chang *et al.,* 2008). Some studies have examined both direct and indirect relationships (Orens *et al.,* 2010).

Findings to date of empirical research into establishing the link between the various proxies used for disclosure and the cost of capital have been mixed. Possible reasons for these mixed results include different information environments (e.g. developed versus developing countries), different research methodologies, and the variety of different proxies that have been used to measure disclosure.

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[28] Results showed that in an imperfect competition setting a positive association exists between information asymmetry and the cost of capital compared to a perfect competition setting where no relationship exists.

According to Khadaroo (2005a: 66), web reporting practices are possibly linked to the stage of economic development of a country. This author's argument is based on a higher observed level of Internet reporting for Singapore compared to Malaysia. In the Khan (2006: 146) study, countries were classified according to the World Bank classification scheme into low income, lower middle income, upper middle income and high income. Khan (2006: 151) found higher disclosure scores for listed companies in high-income countries, with a drop in the disclosure score (specifically related to the non-financial elements of the disclosure score) for low-income countries.

Nel and Baard (2007) compared the Internet investor relations of the largest 40 listed companies in South Africa to those of selected countries in the rest of Africa (Egypt, Kenya, Morocco, Nigeria and Tunisia) and found that companies from the rest of Africa consistently rated lower than the South African companies in all categories of their measurement instrument.

Research carried out by Debreceny *et al.* (2002: 392) found that the overall financial reporting disclosure environment is significant in predicting the presentation and content of Internet financial reporting, while Aerts *et al*. (2007) and Orens *et al*. (2010) documented variations in the associations between disclosure and information asymmetry and the cost of capital given the institutional regime. According to Aerts *et al.* (2007: 1302), each country's institutional regime provides managers and information intermediaries with different incentives to produce or use information.

Verrecchia (2001: 175) suggested that, given the rich disclosure environment in certain capital markets, for example the US, additional voluntary disclosures may lead to economic consequences that would be difficult to measure. This author suggests more research using developing country data.

Francis, Khurana and Pereira (2005a: 1126) gave two reasons why voluntary disclosure and the expected benefits thereof are not likely to occur in countries outside the US. Firstly, disclosure may not be viewed as credible if investor protection is weak and, secondly, there is a lesser need for voluntary disclosure in countries with predominantly bank-centred financial systems.

Gray, Radebaugh and Roberts (1990) documented different perceptions of the cost–benefit relationship of specific items of voluntary disclosure (e.g. value-added statements, description of major capital expenditure projects, employment information and advertising expenditure) among UK and US financial executives. They found that voluntary disclosure items that are perceived to be valuable in one country are not always valuable in other countries.

1.3.2 Study purpose, research problem and research questions

The purpose of this study is to investigate the quality of the corporate website for investor relations purposes in South Africa, to establish the determinants thereof, and to establish whether the use thereof has any effect on the level of information asymmetry and the cost of capital.

Following Gajewski and Li (2015), Chang *et al.* (2008) and Froidevaux (2004), companies' Internet investor relations were used in this study as a proxy for disclosure quality owing to the increased popularity and advantages of using the corporate website as communication medium.[29] The underlying motivation for setting this purpose was to shed some light on the benefits of a well-developed Internet investor relations (IIR)[30] programme by examining the effect thereof for information asymmetry and the cost of capital.

It is important to distinguish between the quality of information and the quality of the communication process. Authors such as Kothari, Li and Short (2009) and Bhattacharya, Ecker, Olsson and Schipper (2007) studied the quality of information.

Kothari *et al.* (2009) categorised disclosure as either favourable or unfavourable (i.e. good news or bad news) and separately examined the relationship between favourable and unfavourable disclosure with the cost of capital. Bhattacharya *et al.* (2007) used three proxies for earnings quality to study the relationship between earnings quality, information asymmetry and the cost of equity: accruals quality, absolute normal returns and earnings variability.

The majority of studies surveyed for this dissertation made no attempt to distinguish between the quantity and quality of IIR (see Table B1, Annexure B). As discussed in Sections 3.2.4.1 to 3.2.4.5, various approaches are suggested in the literature as proxy for disclosure quality.

Firstly, it has been argued that the extent of information disclosed (i.e. content) is an indicator of quality (Lang & Lundholm, 1993; Louwers *et al.*, 1998; Ashbaugh *et al.*, 1999; Botosan, 1997; Leuz & Verrechia, 2000; Healy & Palepu, 2001; Bollen *et al.*, 2006; Abdelsalam *et al.*, 2007; Trabelsi *et al.*, 2008).

Secondly, it is argued that the use of presentation technology-related attributes may improve the accessibility, navigation and timeliness of information, resulting in an improvement in quality (Ashbaugh *et al.*, 1999; Debreceny *et al.*, 2002; Davey & Homkajohn, 2004; Marston & Polei, 2004; Khadaroo, 2005a; Chang *et al.,* 2008). Further, as discussed in Section 1.2.4 above, many of the advantages of IIR depend on the proper use of presentation technology-related attributes. While the proper use thereof can enhance the quality of IIR, the inappropriate use thereof can compromise its usefulness, as discussed in Section 1.2.5.

Finally, quality is measured through the measurement process (Trabelsi *et al.*, 2008). As discussed in Section 3.2.3.3, various studies have motivated the use of weights to reflect the usefulness attached to attributes by the users of the information (Celik *et al.*, 2006; Aerts *et al.*, 2007; Bollen *et al.*, 2006).

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[29] Research by Lang and Lundholm (1993: 257-258) found that annual report disclosure levels are positively correlated with the disclosure levels provided through corporate investor relations media and other publications.

[30] For the purpose of this dissertation, the abbreviation IIR will henceforth be used in this study to refer to Internet investor relations according to the dissertation title.

As discussed in Section 3.3.3, this study attempted to measure quality by measuring content as widely as possible (also refer to Section 3.3.1) by measuring the presentation of information (i.e. accessibility, timeliness and navigation) and by measuring attributes as partially available (0.5) based on the breadth, depth, usability and timeliness of information as opposed merely to measuring attributes as available (1) or absent (0). Although there was some subjectivity involved in such a methodology, the dissertation promotes the argument that such that such an approach is important to ensure the quality of IIR is measured and not merely the quantity. The methodology followed in this dissertation to measure attributes as partially available (0.5) is specifically discussed in Sections 3.3.3, 4.3 and the measurement conventions in Annexure C.

For the purpose of this study, IIR is therefore defined as to refer to the quality of IIR, as described above, throughout his dissertation. Following Bollen *et al.* (2006: 297), this study, however, did not measure the quality of disclosure content nor distinguish between favourable and unfavourable information as disclosed by companies on their corporate websites.

The research problem of this study therefore is: Will variations in IIR between companies have any effect, positive or negative, on the level of information asymmetry and cost of capital?

The research problem is addressed by answering three research questions. The research questions are:

Research question 1: To what extent do JSE-listed companies use corporate websites to communicate with investors?

Research question 2: What company characteristics best explain variations in IIR?

Research question 3: Will variations in IIR have an effect on the level of information asymmetry and cost of capital?

1.4 RESEARCH DESIGN

1.4.1 Research plan

The first objective of the study is to develop a measurement instrument that could be used to measure the extent of IIR. Although a wide variety of existing measurement instruments exist and are described in the literature, this study opted to develop an instrument owing to the shortcomings of current instruments, as discussed in Chapter 3.

The second objective is to use this measurement instrument to measure the extent of IIR scores[31]. For reasons of practicality in terms of cost and time limitations the measurement of IIR was limited

[31] Given the unique characteristics of the various devices through which corporate websites can be accessed (e.g. personal computer, mobile phone or IPAD), this study is limited to the use of personal computers as access device. For the purpose of this study, it was assumed that the majority of investors would use personal computers to access corporate websites for investment decisions.

to a sample of JSE-listed companies. As further discussed in Chapter 4, results were used to ascertain the validity and reliability of the instrument.

The third objective is to establish the determinants of IIR by means of a regression model linking IIR to selected explanatory variables, as identified in the literature.

The fourth objective is to examine the relationship between IIR and information asymmetry through the use of a regression model to identify the determinants of information asymmetry. Proxies to estimate information asymmetry, as well as additional explanatory variables, were identified following a comprehensive literature review.

The fifth and sixth objectives are to examine the relationship between IIR and both the cost of debt and the cost of equity through the use of regression models to identify the determinants of the cost of debt and the cost of equity. Proxies to estimate the cost of debt and the cost of equity, as well as additional explanatory variables, were identified following a comprehensive literature review.

The seventh and final objective is to examine the relationship between IIR and the cost of capital through the use of a regression model to identify the determinants of the cost of capital.

1.4.2 Sample selection

As the sample is used to make inferences about the population, the sample size is set on 25% of the defined population of 315 companies. As discussed in Chapter 4, a final sample of 85 companies is selected.

Cheng, Courtenay and Krishnamurti (2006) used a similar sample size (23% of companies listed on the Singapore Stock Exchange or 104 companies) to examine the impact of increased voluntary disclosure on market information asymmetry. When comparing sample sizes, studies should be categorised according to the proxy used for disclosure: content analysis using a measurement instrument (i.e. direct disclosure measurement) or an indirect measure (e.g. analyst ratings). Given the laborious process of doing a content analysis, indirect disclosure proxy studies are often associated with larger sample sizes. Botosan and Plumlee (2002), for example, used Association for Investment Management and Research (AIMR) ratings as disclosure proxy to study 3 618 companies over an 11-year period.

The sampling technique that was used was stratified random sampling with proportional allocation. The sample selection procedure is discussed in detail in Chapter 4.

1.4.3 Research methodology

Different research methodologies are applied throughout the study. The methodologies are described in the chapters dealing with each of the research questions. Figure 1.2 provides an overview of the research methods that are used in this study.

1.4.4 Distinctive characteristics of the research

As discussed in Chapter 3, this study developed a measurement instrument based on best practices published by the Investor Relations Society (IRS), a comprehensive literature review and a pilot study. Compared to existing measurement instruments, the measurement instrument used in this study is more comprehensive. It also attempted to measure the quality of the communication process by considering not only the timeliness and navigation of information, but also the usefulness (e.g. the completeness) of information supplied.

The measurement instrument that is used consists of 346 attributes and by comparison with earlier related studies, as summarised in Table B1 in Annexure B, is by far the most comprehensive instrument available to date. As discussed in Chapter 4, corporate websites were carefully scrutinised to assess the availability or absence of attributes for each company over a six-month period, March to September 2015.

To date, findings of empirical research have been mixed as regards establishing the link between the various proxies used for disclosure and, respectively, information asymmetry and the cost of capital. Possible reasons for these mixed results include different information environments (e.g. developed versus developing countries), and research methodologies, as well as the variety of different proxies that have been used to measure disclosure.

The majority of empirical studies on voluntary disclosure, information asymmetry and the cost of capital have been developed using developed country samples, specifically US data. Further, most of these studies measured voluntary disclosure using either analyst ratings (or equivalent) as disclosure proxy, or measured voluntary disclosure using the annual report as disclosure medium.

Of the studies reviewed in the literature study in this dissertation, only the following studies examined the association between disclosure and either information asymmetry or cost of capital using corporate websites as disclosure medium: Froidevaux (2004); Aerts *et al.* (2007); Trabelsi *et al.* (2008); Chang *et al.* (2008); Cormier *et al.* (2009); Lai, Lin, Li and Wu (2010);[32] Orens *et al.* (2010); Epping and Wilder (2011); and Gajewski and Li (2015). All these studies were performed in northern America and continental Europe, except Chang *et al.* (2008), which took place in Australia and Lai *et al.* (2010) in Taiwan.

This study therefore further contribute to the body of knowledge by using data from a developing country, namely South Africa. It should however be noted that even within developed countries mixed results were reported. For example, Orens *et al.* (2010) and Aerts *et al.* (2007) found different associations between disclosure and information asymmetry between northern American and continental European countries.

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[32] Lai *et al.* (2010) measured the association between share price returns and corporate website disclosures.

Although investor relations were defined earlier in this dissertation to include disclosure, few studies using the corporate website as disclosure medium have specifically referred to investor relations in their studies, with the exception of Deller, Stubenrath and Weber (1999), Brennan and Kelley (2000), Geerings, Bollen and Hassink (2003), Froidevaux (2004), Hamid (2005), Bollen *et al.* (2006), Chang *et al.* (2008), Ryan (2010), Sabelfeld (2011), Gajewski and Li (2015), and Esterhuyse and Wingard (2016).

To date, previous studies conducted in the South African environment have been limited to mere descriptive studies (Lymer *et al*., 1999[33]; Stainbank, 2000; Venter, 2002; Loxton, 2003; Barac, 2004; Nel, 2004; Bollen *et al*., 2006[34]; Nel & Baard, 2007; Esterhuyse & Wingard, 2016). This is the first South African study to establish the determinants of IIR, and to test for associations between IIR and, respectively, information asymmetry and the cost of capital.

1.5 DETAILS OF THE STUDY

Figure 1.2 provides an overview of the research questions, objectives and methods that are used in this study, as well as an outline of the relevant chapters. Below is a summary of each chapter.

Chapter 2: Literature review

IIR is a voluntary activity, but it is well-known that JSE-listed companies are mandated to publish annual reports in accordance with the IFRS. Chapter 2 explains the voluntary nature of IIR in terms of the South African regulatory environment, followed by an examination of the underlying theories that can be used to explain why companies will engage in voluntary disclosure practices such as IIR. Given the interdisciplinary nature of this study, an explicit review on IIR is provided.

Next, the following aspects are discussed: theories explaining why disclosure, and IIR, should have an effect on information asymmetry and the cost of capital; and proxies that have been used in the literature to estimate information asymmetry, cost of equity and the cost of debt, and empirical evidence to date on such relationships. Finally, Chapter 2 looks at the endogeneity problem in the context of studies that examine the association between disclosure and, respectively, information asymmetry and the cost of capital.

Chapter 3: Data collection instrument

Chapter 3 first discusses disclosure proxies that were used in earlier studies, followed by an overview of the shortcomings and diversity of existing direct disclosure proxies. This is followed by a discussion of the methodology used in the development of the instrument and a brief discussion of how the instrument was implemented.

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[33] South Africa and 21 other countries
[34] South Africa and five other countries

Chapter 4: Empirical results of the content analysis

Chapter 4 briefly discusses how the study sample was selected, how reliability and validity concerns were address and the challenges that arose in measuring the IIR of the sample companies. Results are discussed by means of a vertical analysis (i.e. average availability per attribute) and a horizontal analysis (i.e. analysis of IIR scores per company). In the vertical analysis an overview is first given of the results without referring to individual attributes, followed by a discussion of the availability of attributes in general and per category, and finally a detailed discussion per attribute, organised into eleven categories.[35]

The horizontal analysis entails a discussion of the variability of IIR scores over individual companies, as well as according to JSE listing status (e.g. sector, board, dual and primary listings). Alternative IIR scores, based on the average availabilities of attributes, are also calculated. Finally, a summary and discussion of the results, with a brief discussion of how the strategic decision-making process of companies may influence IIR, is provided. Recommendations are made on how companies could improve the usability of their IIR.

Chapter 5: Determinants of IIR

Chapter 5 addresses the third objective of the study, namely to establish the determinants of IIR. Following an extensive literature review, independent variables used in earlier studies to explain disclosure levels are identified and discussed. A conclusion is drawn about which company characteristics best explain variations in IIR levels.

Chapter 6: Information asymmetry

The fourth objective of the study, namely to examine the relationship between IIR and information asymmetry, is addressed in Chapter 6. Five alternative proxies (the bid-ask spread, price impact, share price volatility, share turnover and analyst following) to estimate information asymmetry are used. In addition to IIR, independent variables used in earlier studies to explain information asymmetry are identified and discussed. A conclusion is drawn on whether variations in IIR also cause variations in information asymmetry levels.

Chapter 7: Cost of debt

The fifth objective of the study, namely to examine the relationship between IIR and the cost of debt, is addressed in Chapter 7. The cost of debt is measured as the interest expense scaled by the interest-bearing debt of the company. As in Chapter 6, additional independent variables used in earlier studies to explain the cost of debt are identified and discussed. A conclusion is drawn on whether variations in IIR also cause variations in the cost of debt.

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[35] Accessibility, Navigation, Timeliness, Company information, Financial information, Shareholder information, Investment case, Relevant news, Bondholder information, Corporate governance, and Corporate responsibility.

Chapter 8: Cost of capital

The sixth and the seventh objectives of the study, namely to examine the relationship between IIR, and respectively the cost of equity and the cost of capital, are addressed in Chapter 8. Cost of capital is calculated as the weighted average of the cost of equity and the cost of debt. Although the capital asset pricing model (CAPM) was used to estimate the cost of equity, the earnings-to-price ratio and realised returns method are also given due consideration as cost of equity proxies. A similar methodology to the one followed in Chapter 7 is followed here. A conclusion is drawn on whether variations in IIR also cause variations in, respectively, cost of equity and cost of capital levels.

Chapter 9: Summary and conclusions

A summary of the study is given and a conclusion is drawn. Limitations and suggestions for future research is discussed.

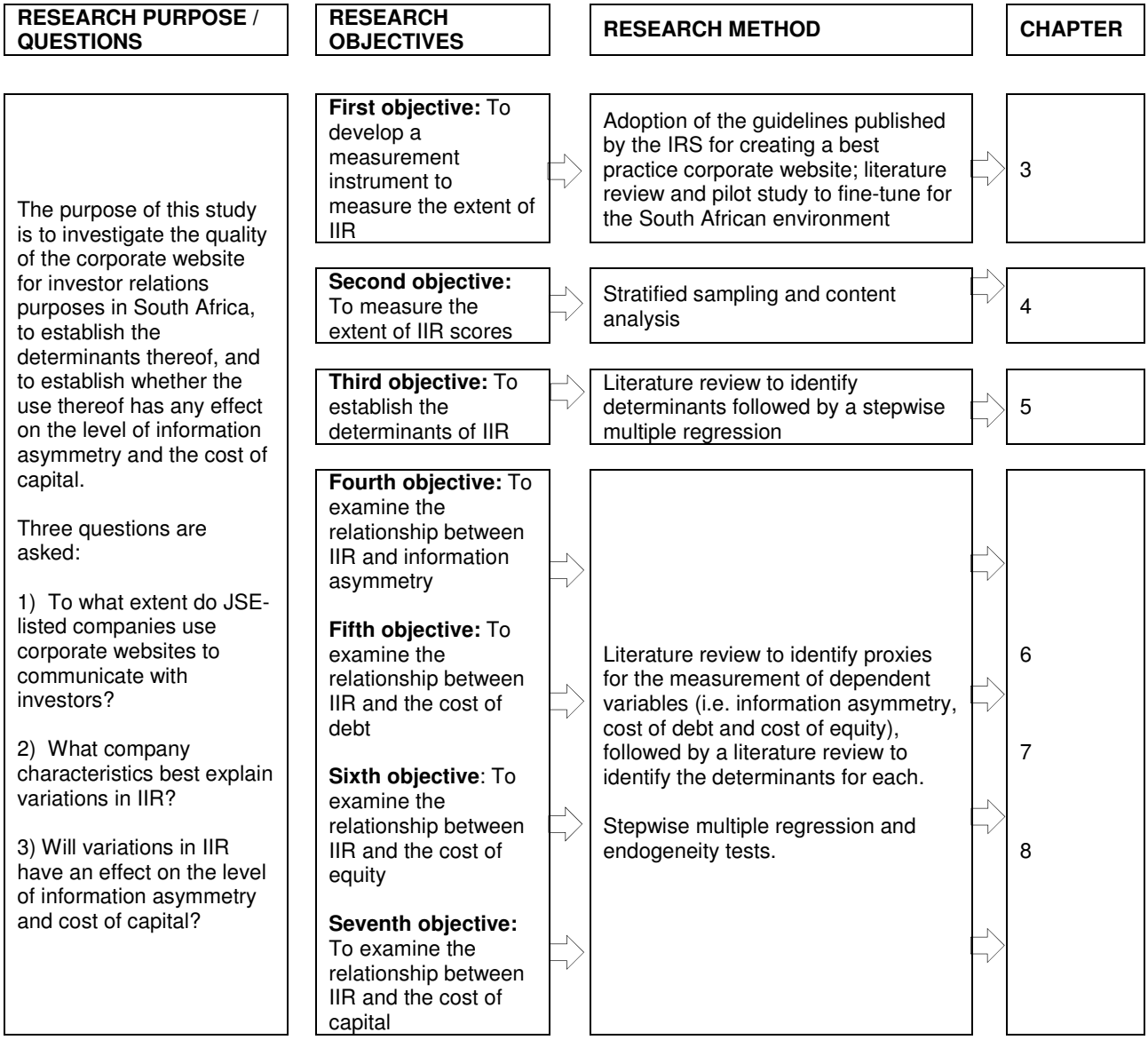

Figure 1.2: A concise summary of the flow of the study

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

Various communication channels are available to companies to communicate with investors. One communication channel is the annual report. As briefly discussed in Section 1.2.2, the contents thereof are regulated by various standards, acts and codes.[36] Such regulated content could be referred to as mandatory disclosure.

In addition, companies may also disclose information voluntarily, for example forecasts and dividend policy decisions. A number of communication channels are available for voluntary disclosures, such as annual reports, company-specific reports, media releases, presentations and corporate websites. De La Bruslerie and Gabteni (2011) referred to mandatory disclosures as financial information and voluntary disclosures as financial communication. FASB (2001: v) defined voluntary disclosure as disclosure primarily provided outside the financial statements – therefore disclosure not explicitly required by Generally Accepted Accounting Principles (GAAP) or SEC rule.[37]

Previous research using South African data (Venter, 2002; Loxton, 2003; Barac, 2004; Nel & Baard, 2007; Esterhuyse & Wingard, 2016) found that almost all of the largest[38] JSE-listed companies did have a working corporate website with a dedicated investor relations section. Although nearly all of these companies also publish annual reports on their websites, research reports significant variations in the content and presentation of corporate website information. Although the contents of annual reports, as such, are regulated by various standards, acts and codes, the distribution thereof is less regulated.

The 1973 Companies Act (RSA, 1973) stipulated that companies should send a hard copy of their annual financial statements to all shareholders and that companies were only allowed to substitute hard copy statements with electronic statements if the shareholder entitled to receive the financial statements agreed thereto in writing, and if the company were so authorised by its articles.

The 1973 Companies Act was replaced with the 2008 Companies Act on 1 May 2011. According to Section 31 of the 2008 Companies Act (RSA, 2008), a company has to issue a notice to each shareholder when the annual financial statements become available. This notice should set out the steps for shareholders to receive a copy of the statements, which may be in the form of an

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[36] In South Africa the contents of the annual report (e.g. the integrated annual report) are regulated, among others, by the International Financial Reporting Standards (IFRS), Companies Act (RSA, 2008), JSE listing requirements, and King III corporate governance code.

[37] The Financial Accounting Standards Board (FASB), based in the US, issues Generally Accepted Accounting Principles (GAAP), while the International Accounting Standards Board (IASB) issues International Financial Reporting Standards (IFRS). IFRS standards are applicable to JSE-listed companies. The Securities and Exchange Commission (SEC) regulates stock exchanges in the US in a similar way as the JSE Listing Requirements does.

[38] Venter and Barac studied the largest 100 listed JSE companies; and Loxton, and Nel and Baard the largest 40. The Esterhuyse and Wingard (2016) study is discussed in Section 3.4.

electronic[39] or a hard copy. Shareholders are only entitled to a hard copy if they specifically request one from the company.

It should be emphasised, though not expected, that companies could still opt to distribute hard copy statements only to all shareholders and that the electronic copy, as such, could, in addition to placing it on the corporate website, be distributed in a number of alternative ways, such as e-mail, Facebook or even by compact disc (CD). Given the definition of IIR in Chapter 1, annual financial statements are in fact only a small, although important, component of IIR.

Investor relations, encompassing the management of shareholder relationships, is also important from a corporate governance perspective. King III (2009) [40] recommends that the board of directors should monitor the relationship between management and the stakeholders[41] of the company. Chapter 8 of the King III code is devoted entirely to the governance of stakeholder relationships and requires listed companies to adhere to the following broad principles:

- The board should appreciate that stakeholders' perceptions affect a company's reputation.
- The board should delegate management to deal proactively with stakeholder relationships.
- The board should strive to achieve the appropriate balance between its various stakeholder groupings, in the best interests of the company.
- Transparent and effective communication with stakeholders is essential for building and maintaining their trust and confidence.
- The board should ensure that disputes are resolved as effectively, efficiently and expeditiously as possible.

Besides in the matter of the distribution of annual financial statements (required by the Companies Act) and the governance of stakeholder relationships (recommended by King III), neither the Companies Act nor King III attempt to regulate IIR. Another important regulatory body in the South African context is the JSE, specifically with its JSE listing requirements. The JSE listing requirements refer to corporate websites in Section 8.63. According to this section, only key corporate governance information as per King III should be disclosed in the integrated report, with more detailed reporting in a register format on the corporate website (JSE, 2016a).

The investor relations activity, and therefore IIR, is not regulated in South Africa. With a few exceptions, such as AIM in the UK[42] and the European transparency directive (2004/109/CE)), IIR

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[39] According to wiki.answers.com an electronic copy usually comprises an image of a document that may be stored on a computer system.
[40] King III is a governance compliance framework issued by the Institute of Directors in South Africa (IoDSA), and compliance is a JSE requirement.
[41] Stakeholders include, but are not limited to, shareholders, suppliers, customers or clients, community, employees, unions, government and creditors.
[42] Companies listed on the Alternative Investment Market (AIM) of the London Stock Exchange (LSE) must from admission maintain a website on which specific identified information must be made available free of charge as per AIM Rule 26.

is also not regulated in the international environment and this study could therefore be classified as a voluntary disclosure study, given the definition of IIR.

Literature can be categorised as descriptive, determinant or effect studies. Descriptive studies merely describe the use of the corporate website as investor communication channel without any, or with little, attempt to measure the reasons therefor or the effect thereof. Determinant (also referred to as association) studies, on the other hand, explore the possible determinants of IIR, and effect studies the consequences or benefits thereof. An extensive number of descriptive, determinant and effect studies were examined in the development of the measurement instrument discussed in Chapter 3. Determinant studies are further discussed in Chapter 5 and effect studies in Chapters 6, 7 and 8.

With reference to the disclosure proxy, the majority of US disclosure studies to date have used analyst ratings (e.g. AIMR) as disclosure proxy. On the other hand, most studies in developing countries have used disclosure measurement instruments to measure disclosure when doing a content analysis, as analyst ratings were not readily available in these countries compared to developed countries.

Content analysis studies can further be categorised according to the disclosure medium measured, such as annual reports or corporate websites. Ahmed and Courtis (1999) conducted a meta-analysis of determinant studies based on an examination of the conventional print-based annual report, while Abdelsalam, Bryant and Street (2007) provided an overview of determinant studies based on an examination of corporate websites as disclosure medium.

The remainder of this chapter is organised as follows: In Section 2.2, theories that were used in past studies to explain variations in disclosure levels, including IIR, are discussed. One of these theories, cost–benefit analysis, holds that companies engage in voluntary disclosure practices given the expected benefits thereof. Although various benefits are discussed in the literature, an important benefit, if not the most important benefit, is an expected decrease in the cost of capital.

These benefit studies can be categorised as either direct or indirect studies. Direct studies investigate the direct relationship between disclosure and the cost of capital, compared to indirect studies that investigate the relationship between disclosure and a measure that is believed to influence cost of capital, such as information asymmetry.

Section 2.3. provides an overview of the concept of IIR. Sections 2.4 (information asymmetry) and 2.5 to 2.7 (cost of capital) provide an overview of theories and proxies, with some empirical findings that were used in past studies to examine the benefits of voluntary disclosure practices. The influence of endogeneity on the measurement of these benefits was discussed in Section 2.8, followed by a chapter conclusion and summary as Section 2.9.

2.2 THEORIES EXPLAINING VOLUNTARY DISCLOSURE

2.2.1 Agency problem

In the case of most listed companies, investors will not participate in the daily management of the company. The consequence is a separation of ownership (investors) and control (management), in terms of which management, by default, has access to all the information available about the company, while investors, by default, do not. As a result, management may act against the best interest of investors by either withholding or falsifying information (Froidevaux, 2004: 13). This separation is the basis of the agency and the information problem.

The agency problem arises as a result of the conflicting incentives between managers and investors. According to Xiao, Yang and Chow (2004: 197), an assumption of agency theory is that shareholders would price-protect themselves against expected expropriations by management. Craven and Marston (1999: 323) asserted that agency theory predicts that voluntary disclosures levels are likely to be influenced by managers' expectations of the share price effect thereof. The following three hypotheses (the capital market transactions hypothesis, the corporate control contest hypothesis, and the share compensation hypothesis) directly or indirectly prompt the increase of the share price of the company.

This capital market transaction hypothesis is based on the assumption that investors' perceptions are important to companies that are expecting to issue either public debt or equity. If the management of a company is in possession of information not known to investors and this information represents good news, then management would have an incentive to increase disclosures in order to communicate such information to investors and, thus, to decrease the expected cost of the share issue.

Lang and Lundholm (2000: 623) supported this hypothesis by documenting a significant increase in disclosure in the six-month period before an equity share offering, while Trabelsi *et al.* (2008: 144) documented a significant positive association between incremental disclosure on corporate websites and financing activities. Further support for the capital market transaction hypothesis was given by Lang and Lundholm (1993) and Healy, Hutton and Palepu (1999).

The corporate control contest hypothesis is based on the principle that, if managers face the risk of losing their jobs as a result of poor share and earnings performance, they will increase disclosure in order to reduce the risk of undervaluation and to explain poor earnings performance (Healy & Palepu, 2001: 421).

According to the share compensation hypothesis, managers who are compensated by means of share-based compensation plans have incentives to disclose more information, for example to comply with insider trading rules or reduce the risk of undervaluation. According to Healy and Palepu (2001: 422), research by Noe (1999) and Aboody and Kasznik (2000) supports this hypothesis.

2.2.2 Information problem

The information problem can be divided into the amount of information risk (i.e. the estimation risk associated with the quality of the information) and the distribution of information risk among investors and between investors and the management of the company (i.e. information asymmetry).

According to Healy and Palepu (2001: 407-409), an information or 'lemons' problem may arise as a result of information asymmetry and the agency problem.[43] This information problem may hinder the ability of investors to distinguish between good (peaches) and bad (lemons) investment opportunities and this, in turn, may result in a suboptimal allocation of investors' savings as a scarce resource. In order to solve this problem, Healy and Palepu (2001: 409) proposed a number of possible solutions: optimal contracts between investors and managers, the regulation of disclosure, corporate governance, and information intermediaries.

Increased disclosure levels may therefore be an attempt by management to remedy the information problem.

2.2.3 Signalling theory

Signalling theory was first described by Spence[44] (1973: 356), using job market signalling as a case study, i.e. signalling used by high-quality employee applicants to distinguish themselves from other applicants. Applicants used education to signal their quality to their prospective employers. Their decision to use education to signal their quality was based on information asymmetry between the applicants and the prospective employer.

Kirmani and Rao (2000: 68) provided the following example to illustrate the basic signalling model. Kirmani and Rao (2000: 68) distinguished between high-quality and low-quality companies where both know their own quality, but outsiders (e.g. investors) did not, resulting in information asymmetry. Each company had the opportunity to signal its quality to outsiders. When high-quality companies signal, they receive Payoff A, and when they do not signal, they receive Payoff B. Low-quality companies, on the other hand, receive Payoff C when they do signal and Payoff D when they do not signal. Signalling is therefore a feasible strategy for high-quality companies when Payoff A exceeds Payoff B and when Payoff D exceeds Payoff C. In these circumstances, where high-quality companies will signal and low-quality companies will not, outsiders will be able to distinguish accurately between high- and low-quality companies based on signalling. Alternatively when both types of companies benefit from signalling, investors will not be able to distinguish between the two types of companies.

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[43] The potential negative consequences of information asymmetry was first described by Akerlof in his 1970 article, The Market for Lemons: Quality Uncertainty and the Market Mechanisms, for which he was awarded the Nobel Memorial Prize in Economics in 2001 (shared with Michael Spence and Joseph Stiglitz for their analyses of markets with asymmetric information) (Nobelprize, 2016).

[44] Joint recipient of the Nobel Memorial Prize in Economics in 2001 (see footnote 43).

Conelly *et al.* (2011: 44) discussed the following as key elements of the signalling theory: signaller, signal, receiver, feedback and signalling environment.

The signaller is defined as an insider who obtains information (positive or negative) that is not available to outsiders. According to Conelly *et al.* (2011: 44), signalling theory focuses primarily on the deliberate communication of positive information in an effort to communicate positive organisational attributes. Receivers are outsiders who lack information and would like to receive this information.

Efficacious signals have two characteristics, signal observability (i.e. the extent to which outsiders are able to notice the signal) and signal cost. Signals can be divided into pointing signals and activating signals. Pointing signals indicate a characteristic that separates the signaller from its competitors, while activating signals also indicate the characteristic, but are also essential to activating the quality in the signaller.

Signalling will only take place if the signaller will benefit from some action from the receiver that results from the signal. Feedback refers to the countersignals that receivers send back to signallers about the effectiveness of their signals. Distortions in the signalling environment will influence the effectiveness of the signal. Individuals who are unsure about how to interpret the signal may base their decisions on others' interpretation of the signal (Sliwka, 2007).

In the context of this study, the signaller is the company whose investor relations are managed through its corporate website. Receivers will include current and potential investors (equity and debt), customers, suppliers and analysts. The signals will depend on the company's strategy and may vary from reputation building to attract institutional investors to the marketing of its products. Some companies may participate in IIR to signal their competitiveness in the industry and therefore only participate because their competitors do. Feedback may vary from a specific investment decision to increased e-commerce to improved business relationships with customers and suppliers. The signalling environment may be distorted by alternative communication channels available and various receivers and interpreters of such information.

Craven and Marston (1999: 323) argued that the use of IIR may itself be a signal of high quality in that it implies that the company is up to date with the latest technology rather than being old-fashioned and conservative. According to Xiao *et al.* (2004), signalling theory holds that voluntary disclosure is one option for companies to distinguish themselves from peers on dimensions such as quality and performance.

Finance literature often refers to the following specific applications of signalling theory:

- Dividend signalling theory

  The theory suggests that company announcements of increased dividend payments are a signal to indicate strong future prospects.

- Debt signalling theory
  The theory suggests that a commitment to increase debt and therefore pay interest is a signal of financial stability. The reduction of possible future debt is a signal of the company's inability to pay interest and therefore signals a weak financial situation.
- Equity signalling theory
  The theory suggests that companies will only choose an equity issue to raise additional funds if the equity is overvalued (Allen & Morris, 2001: 25).
- Management talent signalling theory
  The theory suggests that talented managers have an incentive to disclose information in order to reveal their management skills to investors (Healy & Palepu, 2001: 424).

2.2.4 Investor recognition hypothesis

Merton (1987) used a capital market equilibrium model to argue, firstly, that better followed and therefore more visible companies will have, *ceteris paribus*, higher valuations and, secondly, that the impact of this investor recognition will be greater for small companies.

The key assumption of Merton's investor recognition hypothesis (IRH) was that when investors construct their optimal portfolios, they only use the securities they know about (Merton, 1987: 488). Merton (1987: 489) further argued that information communicated by companies will only be useful to investors if an investor follows the specific company.

According to the IRH, an investment in investor relations will therefore increase visibility and company value, but for already visible companies, an investment in investor relations will have little incremental value and, according to Hong and Huang (2005) and Doukas, Kim and Pantzalis (2008), may even reduce company value if the investment in investor relations is significant (Agarwal *et al.* 2016: 35).

Agarwal *et al.* (2016: 34) pointed out that empirical research by Lehavy and Sloan (2008), Bodranuk and Ostberg (2009), and Richardson, Sloan and You (2012) provided support for the IRH and showed that investor recognition can help to explain share prices.

2.2.5 The follower's effect

DiMaggio and Powell (1983: 150-152) identified three mechanisms of institutional change: coercive isomorphism (e.g. pressures from government), mimetic isomorphism and professionalisation (or normative isomorphism) (e.g. standards established by professional organisations). Mimetic isomorphism describes the situation where companies base their behaviour on peers.

In the context of this study, mimetic isomorphism refers to the situation where companies in a specific industry, say consumer services, base their internet investor relation strategies upon the strategies followed by industry peers. Lybaert (2002: 220) first described this as the "follower's effect". This leads to some industries providing more information (better IIR) than other industries.

Companies may base their IIR strategies on industry peers for a number of reasons. The first is to enhance organisational legitimacy. Companies may follow early adopters or leaders in an industry in order to appear legitimate by endorsing emergent norms. The second is to decrease uncertainty. Companies may be uncertain about the surrounding technologies or about the needs of investors, and, by adjusting their IIR strategy to peers, may reduce such uncertainties.

2.2.6 Cost–benefit analysis

According to Gray *et al.* (1990: 617), the amount and type of voluntary disclosure will depend upon the outcome of a cost–benefit assessment. The measurement of costs and benefits is however not clear, as is discussed in the next two sections, and thus the reference to *estimated* costs and *expected* benefits.

A cost–benefit argument could be used either to examine why increased disclosure or IIR is required (i.e. expected benefits exceed the estimated costs) or why it may not be feasible (i.e. estimated costs exceed the expected benefits). For example, Hong and Huang (2005: 2-3) asserted that the benefits of having investor relations activities flow to larger shareholders disproportionately, while the costs are shared by all shareholders. Hong and Huang (2005) and Doukas *et al.* (2008) further pointed out that for some companies the costs of an effective investor relations programme will outweigh the benefits, resulting in reduced market values.

2.2.6.1 Estimated costs

Costs include both direct and indirect costs (Verrechia, 1983: 181). Merton (1987: 489) distinguished between two types of direct costs: the cost of gathering and processing the information and the cost of communicating or transmitting the information. Information required by investors will, however, often overlap with the information required by management to manage the company, which will decrease the cost of disclosure. According to the information production cost hypothesis, the cost of preparing and distributing information via corporate websites is independent of the size of the company, although the expected benefits thereof are likely to increase with company size (Pirchegger & Wagenhofer, 1999: 391).

Indirect or proprietary costs, on the other hand, include all the risks associated with voluntary disclosure (e.g. increased competition, competitive disadvantage and increased political visibility) (De La Bruslerie & Gabteni, 2011). According to the proprietary cost hypothesis, companies have an incentive not to disclose information that may, potentially, harm their competitive position (Healy & Palepu, 2001: 424). Three factors determine whether information creates a competitive disadvantage: the type of information (e.g. routine operating data compared to new product development information), the level of detail (e.g. of new product development plans) and the timing of disclosure (e.g. before or after a new strategy is implemented) (FASB, 2001: 18).

According to the litigation cost hypothesis, the threat of shareholder litigation (e.g. legal actions for untimely or inadequate disclosures) may encourage companies either to increase disclosure or to avoid certain disclosures (e.g. forward-looking financial statements) (Healy & Palepu, 2001: 423).

Companies could also consider the costs facing investors to gather the information themselves as an alternative to providing the information. Cormier *et al.* (2009) indicated that a company may decide not to disclosure information if doing so is more costly than having investors incur the costs themselves.

2.2.6.2 Expected benefits

Debreceny *et al.* (2002: 375) categorised empirical studies that examined the benefits of voluntary disclosures into three groups: reduction of agency costs (e.g. Marston & Polei, 2004); reduction of the cost of capital (e.g. Froidevaux, 2004); and an increase in the value of the company (e.g. Marston & Polei, 2004). The FASB (2001: 17) listed the following benefits for companies: lower cost of capital, enhanced credibility, improved investor relations, access to more liquid capital markets, and reduced danger of litigation.

Gray and Roberts (1989: 125) found that for British multinationals the most important perceived benefits of voluntary disclosures were: an improved reputation, better investment decisions by investors, improved accountability to shareholders, a more accurate risk assessment by investors and fairer share prices.

Empirical studies to date that have attempted to measure these benefits (e.g. regression models to link variations in disclosure to the cost of capital) have produced mixed results.

2.3 INTERNET INVESTOR RELATIONS (IIR)

As discussed in Section 2.1 above, Chapter 8 of the King III code is devoted entirely to the governance of stakeholder relationships. Stakeholders include, but are not limited to, investors, suppliers, customers or clients, community, employees, unions, government and creditors. The field of investor relations is concerned with the management of relationships between companies and investors (IRS, 2013).

According to Chang *et al.* (2008: 378) the benefits of investor relations can be observed in two ways: increased visibility as predicted by Merton (1987) and increased disclosure resulting in capital market effects (e.g. increased share price), as documented by Easley and O'Hara (2004).

Section 1.1 defines investor relations to include a wide variety of information types, for example mandatory and voluntary; financial and non-financial; qualitative and quantitative; shareholder services to facilitate relationship management and/or strategic marketing. Given this definition, annual and interim financial statements are in fact only a small, although important, component of investor relations.

Besides annual and interim reports, investor relation communication channels available to companies include, but are not limited to presentations, media releases, face-to-face meetings and the Internet. A wide variety of Internet-related communication channels are available to companies, e.g. the corporate website, Twitter, Facebook and YouTube. As discussed in Section 1.3.2, this study is limited to an examination of the corporate website. For the purpose of this study, Internet is therefore defined to include only corporate websites. As discussed in Chapter 1, the abbreviation IIR is used throughout this study to refer to the quality of Internet investor relations. IIR is therefore defined as the use of the corporate website as investor relations communication channel.

Marston and Polei (2004: 297) argued that, although investors are mainly interested in the extent of information provided, they also want to find this information as quickly and easily as possible. In a similar vein, Chang *et al.* (2008: 376) reasoned that the primary objective of investor relations is not necessarily the provision of information, but rather to improve the flow of information to investors. The advantages of using a corporate website as investor relations communication channel were discussed in Section 1.2.4. Almost all of these advantages depend on the proper use of presentation technology-related attributes. According to Debreceny *et al.* (2002), presentation is important as it can potentially improve the timeliness and verifiability, and ultimately the quality and usefulness, of information.

Although the use of the corporate website as investor relations communication channel can therefore enhance the quality of the investor relations function, the inappropriate use of corporate websites can also compromise the usefulness of the corporate website as investor relations communication channel, as discussed in Section 1.2.5 (e.g. through outdated information, disorientation, lack of clear boundaries and information overload).

The voluntary nature of IIR was discussed in Section 2.1. To aid in answering the second research question (What company characteristics best explain variations in IIR?), various theories that could be used to explain this voluntary nature were discussed above in Section 2.2.

As discussed in Section 1.2.5, two possible consequences of this voluntary nature are, firstly, a cross-sectional variation between companies; and, secondly, an evolutionary, rather than a revolutionary, adoption of IIR by companies. This dissertation therefore assumed from the outset that not all companies will use IIR optimally. Given the third research question[45] of this dissertation in Section 1.3.2, information asymmetry and the cost of capital are discussed in the next four sections in this chapter.

[45] The third research question is: "Will variations in IIR have an effect on the level of information asymmetry and cost of capital?"

2.4 INFORMATION ASYMMETRY

Economic theory suggests two distinct routes in support of the hypothesis that disclosure could decrease the cost of capital, the liquidity route and the estimation risk route.

The liquidity route suggests that improved disclosure will increase liquidity, which will result in a decrease in the cost of capital either through reduced transaction costs or an increased demand. Lower share liquidity and the risk of trading with a better informed investor increase the return required by investors, causing an increase in the cost of capital (Easley & O'Hara, 2004).

Botosan, Plumlee and Xie (2004) argued that the cost of equity will increase if information asymmetry increases, as investors must be compensated for the anticipated transaction costs arising from low liquidity levels or the risk of trading with a more informed party (i.e. the adverse selection component). Amihud and Mendelson (1986, 1989) provided empirical support for a positive association between expected share returns (i.e. cost of equity) and the bid-ask spread.

The estimation risk route is associated with investors' assessments of the parameters of the expected return. An improved quality of information enables investors to make more accurate estimates with less uncertainty about future cash flows and profitability. According to Botosan *et al.* (2004) and Fu, Kraft and Zhang (2012), disclosure only affects the cost of equity if the estimation risk is non-diversifiable. If estimation risk is diversifiable, investors will not be compensated for the estimation risk, and disclosure will have no effect on the cost of capital.

As depicted in Figure 2.1, information asymmetry may exist between the management of a company and its investors, and/or between investors and both the liquidity route and the estimation route depend on the reduction of information asymmetry.

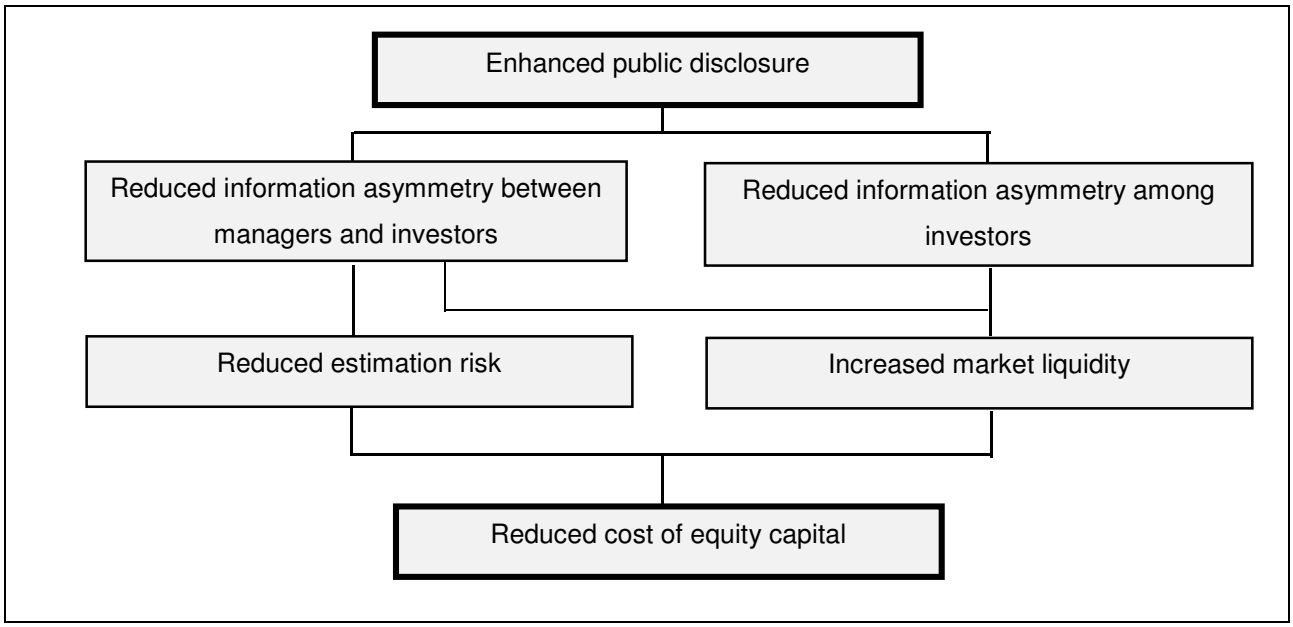

Figure 2.1: The relationship between disclosure, information asymmetry and the cost of equity: the liquidity route and the estimation risk route

Source: Botosan (2000: 61)

Akerlof (1970) first pointed out the negative effects of information asymmetry on the effective functioning of markets. In view of the fact that investors require information in order to evaluate investments, they will either 1) privately gather the required information; 2) buy the required information from other information intermediaries who have already collected and analysed the information; 3) not invest in the company; or 4) make a wrong investment decision (Healy & Palepu, 2001).

In view of both the cost and the knowledge required to gather information, not all investors will be equally informed and this, in turn, may result in there being informed and uninformed investors. Brown and Hillegeist (2007) and Chang *et al.* (2008: 376) described information asymmetry as the situation where some investors have private information (i.e. they are informed traders), while others have only publicly available information (i.e. they are uninformed traders). According to Gajewski and Li (2015: 117), the level of information asymmetry depends on the balance between the informed and the uninformed.

If the informed traders use this information advantage to trade, the uninformed will not trade if they detect such information asymmetry (Gajewski & Li, 2015: 117). Gajewski and Li (2015) therefore argue that the informed traders will have to adjust their bids in order to keep the uninformed in the market. Information asymmetry thus creates costs by promoting adverse selection into transactions between buyers and sellers of company shares (Leuz & Verrechia, 2000: 92).

According to Copeland and Galai (1983) and Glosten and Milgrom (1985), adverse selection typically manifests in reduced liquidity levels. Lev (1988: 1) showed that the consequence of such a state of affairs would be a lower trading volume, higher transaction costs, and market illiquidity or even complete market breakdown. Welker (1995: 802) suggested that information asymmetry may result in a perceived information risk in terms of which the uninformed investor demands compensation in the form of price protection, with this, in turn, leading to a decrease in share liquidity and an increase in transaction costs.

Brown and Hillegeist (2007) relied on two theories to explain why increased disclosure levels may decrease information asymmetry. Theory 1 is based on the assumption that increased disclosure levels will decrease private information search activities, which in turn will decrease information asymmetry. Theory 2, on the other hand, is based on the premise that increased disclosure levels will decrease the proportion of informed to uninformed trading, resulting in a decrease of information asymmetry. These two theories, as explained below, are summarised in Figure 2.2 below. Theory 1, the upper branch in Figure 2.2., is depicted by the green blocks and theory 2, the lower branch, by the blue blocks.

According to theory 1, increased disclosure levels will decrease either or both of the available sets of private information and the expected net benefits of searching for private information, as depicted

by the two lighter green boxes in branch 1 in Figure 2.2. The combined effect is a decrease in private information search activities.

Public information could be viewed as a substitute for private information. Private information will therefore lose its usefulness once the information is published. Increased disclosure will therefore decrease the available set of private information.

Public information will also reduce the incentives for investors either to gather information privately or to buy the information from other information intermediaries. Increased disclosure will therefore lessen the expected net benefits for investors to search for private information, as the information is already available without costs in the public domain. Verrechia (1982) and Diamond (1985) reasoned that incentives for investors to acquire private information decrease as public disclosure increases.

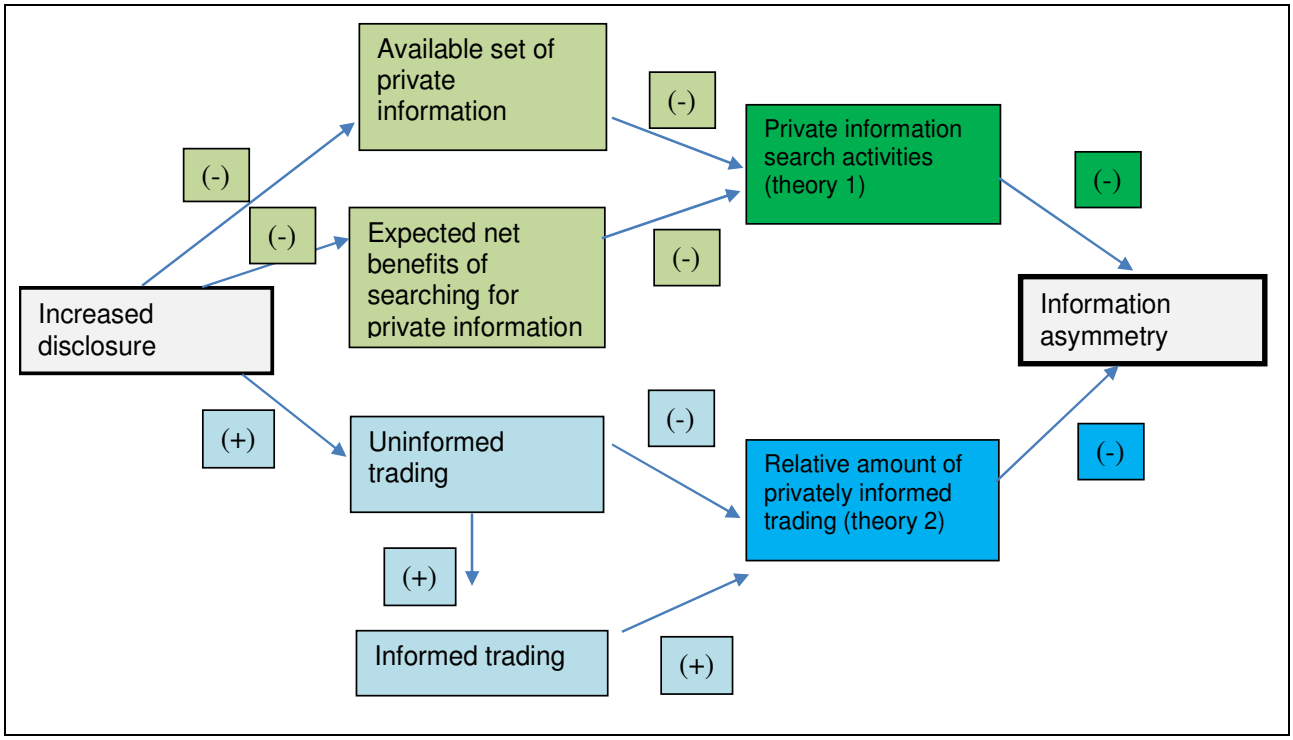

Figure 2.2: The relationship between disclosure, private information search activities, privately informed trading and information asymmetry

Source: Brown & Hillegeist (2007)

Theory 2, as depicted by the lower branch in Figure 2.2, is based on the argument that increased disclosure levels will alter the trading behaviour of uninformed investors through increased visibility which will attract more uninformed traders. Based on the investor recognition hypothesis (Merton, 1987) uninformed investors are more likely to invest in companies with which they are familiar. Increased disclosure levels will therefore increase the amount of uninformed trading. Increased uninformed trading levels will decrease the probability of trading against a privately informed investor.

Figure 2.2 however shows that increased levels of uninformed trading may also increase the levels of informed trading. For example, Chang *et al.* (2008: 378) argued that a well-developed investor relations programme will increase visibility, which leads to increased trading activity, and analyst and institutional following – ultimately resulting in greater private information production (i.e. informed trading).

Brown and Hillegeist (2007) made the case that although the amount of informed trading may increase as a result of increased uninformed trading, informed traders are risk averse and capital constrained, which would ultimately decrease the relative amount of informed trading compared to uninformed trading. Empirical research by Brown, Hillegeist and Lo (2004: 364) supported this argument.

Various proxies have been used in past studies for information asymmetry. For the purpose of this study, these proxies are categorised into three categories. The first two categories, estimation risk (Section 2.4.1) and liquidity (Section 2.4.2), relate to the hypothesised consequences of information asymmetry, as showed in Figure 2.1 above. The third category relates to the relative amount of informed versus uninformed trading activities (Section 2.4.3).

2.4.1 Estimation risk

Aerts *et al*. (2007: 1320) documented a significant negative association between web-based performance (voluntary) disclosure and analyst forecast dispersion for northern American companies. For northern American companies whose performance is followed by several analysts, the association is less significant. However, no significant association was found between disclosure and analyst forecast dispersion for a continental European sub-sample. Trabelsi *et al*. (2008: 121) used analyst forecast dispersion and forecast errors as proxies for the measurement of estimation risk. These authors have documented a negative relationship between the extent of information disclosed on corporate websites and information asymmetry.

Aerts *et al.* (2007) and Trabelsi *et al.* (2008) measured disclosure using self-constructed measurement instruments to measure corporate website disclosures, with Aerts *et al.* (2007) examining northern American and continental European companies, and Trabelsi *et al.* (2008) examining a Canadian sample.

De La Bruslerie and Gabteni (2011) also used a self-constructed index to measure disclosure, but measured only annual report voluntary disclosure. De La Bruslerie and Gabteni (2011) separately examined the association between analyst forecast accuracy, as information asymmetry proxy, and disclosure for two sub-samples of companies listed in France. For sub-sample one, being companies with a disclosure score exceeding the median disclosure score, they report a significant negative association; but for sub-sample two, being companies with a disclosure score below the median disclosure score, they report no association between disclosure and analyst forecast accuracy.

Armstrong *et al.* (2011) used analyst coverage as one of five proxies for information asymmetry[46] to examine the relationship between information asymmetry and the cost of capital. According to Armstrong *et al.* (2011), analyst coverage improves the information environment and could therefore be associated with lower information asymmetry. Healy *et al.* (1999) and Aerts *et al.* (2007) also examined the association between disclosure and analyst following.

2.4.2 Liquidity

The overwhelming majority of studies to date have used a liquidity-based measure as proxy for information asymmetry. The average investor will be more confident about trading in shares if it were possible to be relatively certain that share prices reflect all available information. Thus, reduced information asymmetries between informed and uninformed investors may, potentially, increase share liquidity. Verrecchia (2001: 173) maintained that information asymmetry inhibits investment.

Teall (2013: 13) refers to liquidity as an asset's ability to be easily sold or purchased without causing a significant change in the price of the asset. Black (1971: 30) described liquidity as follows:

i) Bid and asked prices are always available for the investor who wants to buy or sell small numbers of shares immediately.
ii) The difference between the bid and asked prices is always small.
iii) In the absence of special information, an investor who is buying or selling a large number of shares can expect to execute the transaction over a long period of time, at a price not very different, on average, from the current market price.
iv) An investor who wants to buy or sell a large number of shares can do so immediately, but at a premium or discount. The premium or discount will depend on the size of the share block. The larger the block, the larger the premium or discount.

Kyle (1985) described liquidity in three dimensions: (1) width (also known as tightness or bid-ask spread); (2) market depth; and (3) slippage. Market depth refers to a market's ability to process and execute a large order without substantially impacting its price. Slippage (also known as market or price impact or market resilience) is the speed at which the price returns to normal from price pressure resulting from a non-informative trade.

According to Van Wyk, Botha and Goodspeed (2015: 203), liquidity requires marketability (ability to be sold quickly), price continuity (price does not change from one transaction to another in the absence of new information), and market depth.

Teall (2013: 12) listed the following alternative security market execution systems (i.e. procedures for matching buyers to sellers): quote-driven markets, order-driven markets, brokered markets and hybrid markets. Stock exchanges are usually order-driven as opposed to over-the-counter currency

[46] The other four were: quoted bid-ask spread, adverse selection component of the bid-ask spread (spread decomposition based on a trade direction indicator regression), research & development to sales ratio and accruals quality.

and bond markets that are primarily quote-driven. In quote-driven markets, dealers post quotes and participate on at least one side of every transaction, compared to order-driven markets where dealers can trade without the intermediation of dealers. A further distinction is the display of quotes. Quote-driven markets display quotes of specialists and market makers, whereas order-driven markets display all quotes. Orders are the specific trade instructions placed with brokers by traders (Teall, 2013: 13).

The JSE and most US stock exchanges are order-driven, i.e. buyers and sellers submit bid and ask prices to a central location where the orders are matched. The National Association of Securities Dealers Automated Quotations (NASDAQ), on the other hand, is a quote-driven market, i.e. investors must transact though a dealer and price is determined by dealers' bid-offer quotations (Van Wyk *et al.*, 2015: 202).

From the literature review, it was possible to distinguish between four different types of liquidity-based information asymmetry proxies: bid-ask spreads, depth quotes, price impact and share turnover.

2.4.2.1 Bid-ask spreads

The bid-ask spread, also known as the width or tightness, is calculated as the difference between the bid and the ask price. According to Black (1971), as discussed above, a small bid-ask spread is an indicator of liquidity.

Market microstructure literature shows that spread contains three distinct components: order processing costs, adverse selection costs, and inventory holding costs (Ajina, Sougne & Lakhal, 2015). Two types of spread decomposition models have been developed in the literature to estimate these spread components (Ajina *et al.*, 2015). The first uses the serial covariance properties of quotes and transaction prices and the second a trade direction indicator regression. One application of a trade direction indicator regression is the probability of informed trading (PIN), as developed by Easley, Kiefer, O'Hara and Paperman (1996). The PIN model is discussed below in Section 2.4.3.1.

In the absence of intraday data, Cheng *et al.* (2006) used factor analysis to extract two factors from the cross-sectional variance of spread, trading volume and price volatility, which are expected to proxy for informed and uninformed trading, based on the underlying assumption that informed and uninformed trading are mutually exclusive activities. Results reported by Cheng *et al.* (2006) showed that higher levels of informed trading increase bid-ask spreads, trading volume and price volatility compared to higher levels of uninformed trading that reduce spreads and increase trading volume. Further analysis by Cheng *et al.* (2006) showed that increased disclosure reduces the degree of informed trading, but has no effect on the degree on uninformed trading.

The adverse selection component arises as a result of informed traders having to adjust their bid prices to keep the uninformed traders in the market. Chang *et al.* (2008: 382) asserted that periods of high information asymmetry are characterised by uninformed traders that amend their bid (highest

buy price) and ask/offer (lowest sell price) prices away from the market to decrease the probability of trading with an informed trader. According to Leuz and Verrechia (2000: 99), less information asymmetry implies less adverse selection, which means a smaller bid-ask spread.

Research further shows that the spread and the components of spread vary between trade sizes. Lin, Sanger and Booth (1995), for instance, found that the average effective spread increases with trade size. They showed that as order processing cost decreases with trade size, the increase is largely the result of an increase in adverse information revealed from large trades. The adverse selection component of spread therefore increases with trade size. Lin *et al.* (1995) further found that the adverse selection component decreases during the trading day, being highest at the opening and lowest at the closing of each trading day for all but the largest 1% of all trades.

Easley *et al.* (1996: 1406) offered three possible reasons for large spreads: the inventory or liquidity effect, market power and an information-based explanation (i.e. adverse selection cost). The inventory effect is based on higher spreads that are required by specialists (i.e. market makers) to compensate them for having to maintain inventory imbalances for illiquid shares. Market power refers to the situation where only one market maker is active, resulting in a monopolistic situation that allows the market maker to set larger spreads.

The bid-ask spread is the most frequently used proxy to measure information asymmetry (Gajewski & Li, 2015). The following studies, *inter alia*, all used the bid-ask spread as proxy: Welker (1995), Healy *et al.* (1999), Leuz and Verrechia (2000), Heflin, Shaw and Wild (2005), Chi and Wang (2010), Fu *et al.* (2012), Cheng *et al.* (2006), Ajina *et al.* (2015), Chang *et al.* (2008), Orens *et al.* (2010), and Gajewski and Li (2015).

The most popular bid-ask spread used in the literature is the quoted or relative spread, which is calculated by using the following formula:

$$Bid - ask\ spread = \frac{Ask - Bid}{(Ask + Bid)/2} \tag{2.1}$$

where:

Ask = Lowest selling price; and

Bid = Highest purchase price.

The quoted bid-ask spread is unconditional on the order size or variations in the bid-ask spread during the trading day. Some studies (Chang *et al.*, 2008; Gajewski & Li, 2015), employed the time-weighted relative spread, which could be calculated using the following formula from the time-stamped data:

$$\frac{Time\ weighted\ Bid-ask\ spread}{Time\ weighted\ Mid\ point\ price} \tag{2.2}$$

Time-stamped data can also be used to calculate the effective spread by comparing the mid-price to the trading price (e.g. Heflin *et al.* (2005) and Gajewski and Li (2015)) using the following formula:

$$2\,x\,\frac{Trading\ price-(Bid+Ask)/2}{(Ask+Bid)/2} \tag{2.3}$$

Welker (1995: 801) documented that an improvement in disclosure practices reduces information asymmetry, as measured by the bid-ask spread, and this, in turn, increases liquidity in capital markets. Healy *et al*. (1999), Leuz and Verrecchia (2000), Heflin *et al.* (2005) and Fu *et al.* (2012), all using bid-ask spread as proxy, supported this negative association reported by Welker (1995).

It should be noted that none of these studies measured disclosure using a measurement instrument. Welker (1995) and Healy *et al.* (1999), for instance, used analyst ratings as issued by the AIMR as disclosure proxy. Leuz and Verrechia (2000) used the switch from German to US GAAP as disclosure proxy, Heflin *et al.* (2005) used analyst ratings of disclosure as issued by the Financial Analyst Federation (FAF), and Fu *et al.* (2012) used Moody's rankings of financial reporting frequency. Further, all of these studies, except Leuz and Verrechia (2000), were developed using US samples.

Regarding studies that used a measurement instrument to measure disclosure, the following studies reported a negative association between spread and their measurement of disclosure: Cheng *et al*. (2006), Ajina *et al.* (2015), Orens *et al.* (2010), and Gajewski and Li (2015).

Orens *et al.* (2010) reported a negative association only for a continental European sub-sample (Belgium, France, Germany and Netherlands) and reported no association between disclosure and spread for northern American countries (Canada and US).

In addition to investigating the relationship between their total disclosure score and the bid-ask spread, Ajina *et al.* (2015) also examined the relationships for three sub-sets of the total disclosure score: a financial disclosure score, a non-financial disclosure score, and a strategic information score. Although negative associations for the total, as well as for the financial and non-financial disclosure scores, were reported, no significant association between the strategic information score and spread was reported.

Botosan and Frost (2000), as cited by Ajina *et al.* (2015), reported a negative, but not significant, relationship between spread and their measurement of disclosure for a sample of companies listed on the New York Stock Exchange (NYSE). Chang *et al.* (2008) conducted their study using an Australian sample and reported a positive, but not significant, association between their proxy for disclosure, IIR and spread, if controlled for other determinants of spread (trading volume, share price and share price volatility).[47]

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[47] Chang *et al.* (2008) only reported a significant negative association between their disclosure score and spread if disclosure was the only explanatory variable in the regression model. In their OLS multi-regression model for a low investor

2.4.2.2 Depth quotes and depth-adjusted effective spreads

As discussed above in Section 2.4.2, liquidity can be described by using three dimensions: width (bid-ask spreads), market depth, and slippage (Kyle, 1985). Market depth specifies the maximum number of shares for which the quoted bid and ask prices apply.

Heflin *et al.* (2005: 836) argued that if disclosure reduces informed traders' information advantage, increased disclosure levels should decrease spread and increase market depth. Heflin *et al.* (2005: 848) measured the depth quote as the average of the number of shares quoted at the ask price plus number of shares quoted at the bid price, each multiplied with their respective quoted prices.

Results reported by Heflin *et al.* (2005) showed a negative relationship between the level of disclosure and the quoted depth, after controlling for share price, trade size, trade frequency, company size and price volatility. These results therefore suggested that the amount that investors can trade at a given spread is lower, not higher, for companies with higher disclosure levels. Based on theoretical research by Diamond and Verrechia (1991) and empirical research on tick-size reductions, Heflin *et al.* (2005) concluded that improved disclosure levels may reduce market-making rewards, leading to a reduced provision of market-making services and therefore reduced quoted depths.

To examine further the association between disclosure and spread, Heflin *et al.* (2005) calculated a depth-adjusted spread to control for the added trading cost due to lower quoted depths. The depth-adjusted spread was calculated using the following methodology.

Orders that were depth-constrained (i.e. size exceeded the quoted depths) were executed as a split order (i.e. two or more transactions). As it was not possible to observe directly from trade data whether an order was split into two or more trades or even if the order was depth-constrained or not, Heflin *et al.* (2005) classified trade sizes of 80% or more of the quoted depth as depth-constrained. Trade sizes less than 100% were included in order to capture voluntarily split orders. Residual trades (i.e. the second trade of a split order) were defined as trades subsequent to a depth-constrained trade that was on the same side of the market (i.e. buy or sell) as the respective depth-constrained trade.

The next step was to combine the residual trades with their depth-constrained trades, to form estimated depth-constrained orders. For depth-constrained orders, a depth-adjusted effective spread was calculated, and for trades not depth-constrained the normal effective spread, as discussed above in Section 2.4.2.1, was calculated.

Heflin *et al.* (2005) used the following example to illustrate how they calculated their depth-adjusted effective spreads. A trader wished to buy 2 000 shares when the ask price was $20.125, the bid

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relations score sub-sample, the authors reported the hypothesised negative, but not a statistically significant association, between disclosure and spread.

price was $19.875 (the quote midpoint was therefore $20[48]), and the number of shares available at $20.125 was 1 200 shares (i.e. the quoted depth). Assuming that the next best price on the limit order book was $20.25, the number of shares available at $20.25 were 800 shares, and a rise in the ask price to $20.25 after the first transaction. The transaction was then executed as follows: 1 200 shares at $20.125 and 800 shares at $20.25.

In their example, Heflin *et al.* (2005) calculated the depth-adjusted spread as [(1 200 x $0.25) + (800 x $0.50)]/2 000, therefore $0.35. The first part of the calculation (1 200 x $0.25) was based on the normal effective spread calculation, i.e. 2 x (trading price - midpoint), i.e. 2 x ($20.125 - $20). The second part of the calculation for the residual trade ignored the rise in the midpoint after the first trade and calculated the spread as twice the absolute value of the difference between the transaction price (i.e. $20.25) and the price quote midpoint in effect at the time of the first trade (i.e. $20.00).

Using the depth-adjusted effective spread, as calculated above, Heflin *et al.* (2005) reported results that suggest that even after adjusting for the added trading cost due to lower quoted depth, the effective trading costs (i.e. effective bid-ask spread) were lower for high-disclosure-rated companies, even for the largest orders.

2.4.2.3 Share turnover

Cheng *et al.* (2006) and Agarwal *et al.* (2016) calculated share turnover as the trading volume divided by the number of issued shares. Leuz and Verrechia (2000) used the value of shares traded divided by the market capitalisation. Agarwal *et al.* (2016) further adjusted individual company turnover ratios for the market-wide activity. Ajina *et al.* (2015), on the other hand, used the logarithm of the average number of shares traded as proxy for share turnover.

According to Leuz and Verrechia (2000), share turnover captures the willingness of investors to trade and should therefore be negatively related to the existence of information asymmetries. Although Leuz and Verrechia (2000: 99) reported a significant positive association between trading volume and disclosure, they argued that trading volume may not be a reliable proxy for information asymmetry, as trading volume can be influenced by various factors unrelated to information (e.g. changes in risk preferences). Ajina *et al.* (2015), too, found a significant positive association between disclosure and share turnover.

Contrary to the findings of Leuz and Verrechia (2000) and Ajina *et al.* (2015), Cheng *et al.* (2006) reported a significant negative association between share turnover and disclosure. As Cheng *et al.* (2006) also found a negative association between spread and disclosure, they argued that market activity in Singapore (where their study was conducted) was driven by informed trading, as informed traders appeared to avoid companies with better disclosure, resulting in decreased liquidity. The issue of informed versus uninformed traders is further discussed in Section 2.4.3 in this chapter.

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[48] ($20.125 + $19.875) / 2

Agarwal *et al.* (2016: 31) used analyst nominations for a best overall investor relations award as proxy for investor relations quality.[49] Agarwal *et al.* (2016) found a significant positive association between investor relations quality and share turnover for smaller companies, but no association for large companies. Agarwal *et al.* (2016: 47) offered lower visibility, higher information asymmetry and lower management credibility as potential reasons for the increased benefit experience of smaller over larger companies.

2.4.2.4 Price impact

As discussed above in Section 2.4.2, liquidity can be described using three dimensions: width (bid-ask spreads), market depth, and slippage (Kyle, 1985). Slippage (also known as market or price impact, or market resilience) is the speed at which the price returns to normal from price pressure resulting from a non-informative trade.

Price impact captures the ability of an investor to trade in a share without affecting its price. Fu *et al.* (2012) measure slippage as the yearly median of the daily absolute return divided by the trading volume, using the following formula:

$$\frac{Daily\ absolute\ return}{Number\ of\ shares\ traded\ x\ Share\ price} \tag{2.4}$$

Fu *et al.* (2012) examined the impact of more frequent financial reporting (i.e. interim and quarterly) on information asymmetry. The SEC required annual financial reporting in 1934, and raised the required reporting frequency to semi-annually in 1955, and to quarterly reporting in 1970. Fu *et al.* (2012) measured reporting frequency for the time period 1951 to 1973. They argued that more frequent financial reporting could either decrease or increase information asymmetry. If it increased the amount of information available to the public, it could decrease information asymmetry, but if, on the other hand, it incentivised sophisticated investors to acquire private information in anticipation of these disclosures, it could lead to higher information asymmetry due to increased private information acquisition activities.

Although, as depicted in Figure 2.2, increased disclosure levels will only decrease information asymmetry if private information search activities are decreased, the negative association between information asymmetry[50] and the proxy for disclosure (i.e. frequency of financial reporting) reported by Fu *et al.* (2012) suggests that the better information environment provided to investors more than offsets the impact of increased private information-gathering activities.

Ajina *et al.* (2015) referred to price impact as the illiquidity ratio and reported no statistically significant relationship between the illiquidity ratio and their measurement of disclosure (annual report voluntary disclosure using a disclosure checklist based of 112 items for a sample of 196 French companies).

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[49] The annual award is hosted by the Investor Relations (IR) magazine and survey participants include fund managers, buy-side analysts, sell-side analysts and sophisticated retail investors.
[50] Fu *et al.* (2012) used two proxies to estimate information asymmetry, the bid-ask spread and price impact or slippage.

2.4.3 Informed versus uninformed trading activities[51]

As depicted in Figure 2.2 above, disclosure can increase both the amount of uninformed and informed trading, but as long as the relative amount of privately informed trading decreases, an increase in disclosure levels should also result in a decrease in information asymmetry. As informed and uninformed trading is not observable, it has to be inferred. One approach is the probability of informed trading (PIN) model as discussed below.

2.4.3.1 Probability of informed trading

The probability of informed trading (PIN) was developed by Easley *et al.* (1996) in their EKOP model[52]. According to their model, the probability of informed trading can be measured with the following formula:

$$\frac{\alpha.\mu}{\alpha.\mu+2\varepsilon} \tag{2.5}$$

where:

α = the probability of an information event;

μ = the arrival rate of informed traders (i.e. who know the new information); and

ε = the arrival rate of uninformed traders.

The EKOP model is based on the numbers of buyer and seller initiated trades over a period. Easley *et al.* (1996) documented empirical results that show that highly liquid shares have a lower probability of informed trading. The results of these authors also showed that the probability of informed trading does not significantly differ across medium and low liquidity shares.

As discussed in Section 2.4.2.1 above, Easley *et al.* (1996) suggested three possible explanations for differences in spreads: inventory effect, market power, and information. The PIN measures the component of the bid-ask spread that can be explained by differences in the risk of information-based trading.

Easley *et al.* (1996) found higher information-based trading (i.e. PIN) in low liquidity shares. Based on this finding, they argued that large spreads in low liquidity shares are not merely the result of the inventory and market power effects, and that less active shares are therefore riskier as they are subject to more information-based trading. Although their results showed that high liquidity shares have a higher probability of information events and higher arrival rates of informed traders, these are more than offset by the higher arrival rates of uninformed traders. With low liquidity shares, on the other hand, the problem is not that there are too many informed traders, but rather that there are too few uninformed traders. Easley *et al.* (1996: 1 415) emphasised that the calculation of the PIN

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[51] Informed (uninformed) trading refers to trading by market participants with (without) private information about a company.
[52] EKOP is the acronym for the four authors in Easley *et al.* (1996), namely Easley, Kiefer, O'Hara and Paperman.

depends on sufficient data to reliably estimate the underlying trade process, and therefore a minimum level of liquidity is required.

Brown and Hillegeist (2007) described the PIN as a company-specific estimate of the probability that a trade originates from privately informed investors. According to Brown and Hillegeist (2007), an important advantage of PIN is the ability to disaggregate the measure into its component parameters, each of which represents a different aspect of a company's trading and information environment.

Brown and Hillegeist (2007) examined the relationship between AIMR analyst ratings (as disclosure proxy) and the PIN for a US sample. Although they documented a negative association between the total disclosure score and information asymmetry, an analysis of the different types of disclosure revealed only negative associations for annual report and investor relations components, with an unexpected positive association between information asymmetry and the component of the disclosure score that measured the quality of quarterly reports.

Gajewski and Li (2015) examined the relationship between their proxy for disclosure, Internet-based disclosure, and they documented negative associations between disclosure and all five proxies that were used for information asymmetry (quoted spread, effective spread, time-weighted spread, PIN, and adjusted PIN). The adjusted PIN was based on a model developed by Duarte and Young (2009) to adjust for liquidity unrelated to information asymmetry. The Gajewski and Li (2015) study was based on a sample of 180 companies listed on the French *Société des Bourses Françaises* (SBF) 250 index.

2.4.3.2 Price volatility

Leuz and Verrechia (2000) and Cheng *et al.* (2006) measured price volatility as the standard deviation of the daily share returns. Leuz and Verrechia (2000) argued that gradual changes in share prices (i.e. low levels of volatility) indicate lower levels of information asymmetry. Private information revealed to the market further causes price volatility (Cheng *et al.,* 2006).

Leuz and Verrechia (2000) documented no significant association between price volatility and their disclosure proxy (i.e. switch from German to US GAAP), as opposed to Cheng *et al.* (2006) who reported a significant negative association. Cheng *et al.* (2006) further reported that only informed trading has an impact on price volatility, with no association between higher levels of uninformed trading and price volatility.

Bushee and Noe (2000: 200) reported results that show that the effect of disclosure on volatility is complex and may depend on the type of investor (e.g. institutional or retail) that is attracted to the company.

2.5 COST OF EQUITY, COST OF DEBT AND COST OF CAPITAL[53]

Lambert *et al.* (2007: 385) viewed the link between accounting information and the cost of capital as one of the most fundamental issues in accounting. Long before the development of the WWW, various analytical (also referred to as theoretical) and empirical studies were undertaken to explore the relationship between disclosure and the cost of equity. Since the development of the WWW, various studies have attempted to establish a clear link between website disclosure and the cost of equity.

Analytical studies to date have been more successful than the empirical studies, which produced mixed results. The following analytical studies have, *inter alia*, investigated the relationship between disclosure and cost of equity: Easley and O'Hara (2004), Lambert *et al.* (2007) and Lambert *et al.* (2009).

Easley and O'Hara (2004: 1553) used a rational expectations model to document a positive association between investors' required rate of return and the amount of private information. Easley and O'Hara (2004: 1578) argued that a company is able to influence its cost of equity by affecting the precision and quality of information available to investors. This may be accomplished in a number of ways, for example selection of accounting standards, disclosure policies, attracting an active analyst following, and listing decisions.

Lambert *et al*. (2007: 385) used a model that is consistent with the capital asset pricing model (CAPM) to show that the quality of accounting information may influence the cost of equity, both directly and indirectly. The direct effect is based on the relationship between the disclosure and the company's assessed covariance with the cash flows of other companies as compared to the indirect effect where disclosure affects the company's decisions.

According to Lambert *et al*. (2009: 27), it was important to distinguish between information asymmetry (measured as the differences in information precision across investors) and information precision (measured as the quality of investors' information about the cash flow of companies). They used a rational expectations model to show that the average information precision is a more important determinant of the cost of equity than information asymmetry in a setting of perfect competition. They concluded that, once it is possible to control for average precision, information asymmetry has no effect on the cost of equity in a setting of perfect competition.

The literature on the subject could also be categorised into direct studies that examine the direct relationship between some disclosure proxy and cost of equity and indirect studies that examine the relationship between disclosure and a variable that is theorised to have an effect on the cost of

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[53] Although cost of capital, or weighted average cost of capital, refers to the combined cost of equity and cost of debt weighted according to capital structure, literature is not always consistent, and the terms cost of equity, cost of capital, cost of finance and capital costs are used interchangeably.

equity, such as market value (Agarwal *et al.,* 2016), earnings valuation multiple (Cormier *et al.,* 2009) and, as discussed in Section 2.4 above, estimation risk and liquidity.

Regarding disclosure–cost of equity relationship studies, Nikolaev and Van Lent (2005: 678) distinguished between four different types of studies: those that found a strong negative relationship (consistent theoretical predictions), no significant relationship, partial evidence, and a positive relationship. The remainder of this section now separately discusses: (1) studies that found a strong negative relationship, (2) studies that found either no relationship, only partial evidence or a positive relationship, and (3) studies that have examined the conditions under which disclosure will have an effect on the cost of equity.

2.5.1 Strong negative relationships

Studies by Diamond (1985), Glosten and Milgrom (1985), Gibbins *et al*. (1990) and Diamond and Verrecchia (1991) (all as cited in Orens *et al*., 2010: 1058), all found a negative association between voluntary disclosure and the cost of equity.

Hail (2002) examined the association between voluntary annual report disclosure and the cost of equity and found a significant negative association. The author's study included the 50 largest, and an additional 61 randomly selected, companies in Switzerland.

Froidevaux (2004: 74) examined the level of IIR and the cost of equity, and found a significant negative association. Her disclosure metric included information disclosed under the investor relations section on corporate websites by non-financial US companies. The study sample consisted of 160 companies from four industries – healthcare, industrial goods and services, consumer discretionary, and the information technology industry. Twenty large and twenty small companies were selected from each industry.

Francis *et al*. (2005a) relied on voluntary disclosure scores published by the Centre for International Financial Analysis and Research (CIFAR) to examine the association between the cost of equity, cost of debt and disclosure in a multiple-country setting of 34 countries outside the US. The authors found significant negative associations between both the cost of debt and equity, and disclosure. They further reported results that suggest that voluntary disclosure incentives (i.e. reduction of the cost of debt and equity) appear to operate independently of country level.

Orens *et al*. (2010: 1084) found a significant negative association between the level of corporate website non-financial disclosure and the cost of equity capital, with a stronger association in countries with lower quality, mandatory reporting requirements (namely continental Europe as compared to northern America). The sample consisted of 894 companies from continental Europe and northern America, with the largest companies in each country being selected.

Using frequency of reporting as disclosure proxy, Fu *et al*. (2012) documented a significant negative association between disclosure and the cost of equity for their US sample.

Agarwal *et al*. (2016: 31) used analyst nominations for a best overall investor relations award as proxy for investor relations quality. In support of Merton's investors' recognition hypothesis, as discussed in Section 2.2.4, Agarwal *et al.* (2016) found a strong positive relationship between investor relations ratings and market value for both larger and small companies, after controlling for the book value of equity and net income before extraordinary items and dividends. Increased market values could be associated with a decreased cost of equity.

Sengupta (1998), Nikolaev and Van Lent (2005), Orens *et al*. (2010) and Guidara, Khlif and Jarboui (2014) found a significant negative association between disclosure and the cost of debt. Sengupta (1998) and Nikolaev and Van Lent (2005) examined the effect of disclosure on the cost of debt in a US setting, and Orens *et al*. (2010) did the same in a cross-country setting (continental Europe and northern America).

Guidara *et al.* (2014) measured voluntary disclosure levels in annual reports published by a sample of 20 South African non-financial listed companies.

2.5.2 Partial evidence, no significant relationships, and positive relationships

Research by Kim and Verrecchia (1994) and Zhang (2001: 363) suggested that disclosure may also increase the cost of equity if the disclosure leads to a more asymmetrical information environment.

Botosan (1997: 344) examined the relationship between annual report voluntary disclosures and the cost of equity and found that increased voluntary disclosure would reduce the cost of equity for firms with low analyst following, but found no association for firms with a high analyst following. Botosan used an accounting-based valuation model (as developed by Ohlson) to measure the cost of equity, and measured disclosure using a self-constructed index using a US sample.

Richardson and Welker (2001) examined the relationship between their disclosure proxy, annual report ratings as jointly issued by the Society of Management Accountants and the University of Quebec at Montreal, and the cost of equity for a Canadian sample. These authors found no association for the full sample, but, similar to Botosan (1997) for companies with a low analyst following, they found a negative association, but only for financial disclosures. For social disclosure they found an unexpected positive association.

Botosan and Plumlee (2002) studied the relationship between their disclosure proxy, analyst ratings issued by AIMR, and the cost of equity for a US sample. Similar to Richardson and Welker (2001), they found no association for the full sample and total disclosure score. On examining disclosure type, they found a negative association between the cost of equity and annual report disclosure, a positive association for quarterly report quality, and no association for an investor relation category.

Kothari *et al.* (2009) inspected the direct relationship between three risk proxies (cost of capital, return volatility and earnings forecast dispersion) and different aspects of disclosure using a US sample. Their disclosure proxy distinguished between favourable and unfavourable news items

published by the business press, analysts and lastly the company itself (i.e. management). They found a significant negative association between all three risk proxies and favourable disclosure and positive association with unfavourable disclosures.

Examining the source of disclosure, Kothari *et al.* (2009) found no relationship between disclosure (favourable and unfavourable) issued by, respectively, management and analysts, and the cost of capital. Return volatility and analyst forecast dispersion, on the other hand, showed a positive association with unfavourable news published by management. Contrary to news published by management and analysts, all three risk factors decreased with favourable disclosure and increased with unfavourable disclosures, if published by the business press.

Francis *et al.* (2008: 54) used a self-constructed measurement instrument to measure annual report and 10-K[54] disclosure levels for a US sample. Although the authors found a significant negative association between disclosure and the cost of capital, they further reported results that suggest that earnings quality drives voluntary disclosure and, after controlling for earnings quality, the negative association was substantially reduced.

Botosan *et al.* (2004) investigated the association between the cost of equity capital and the precision of public and private information for a US sample. The authors' results suggest the expected negative association between the cost of equity and the precision of public information. Contrary to expectation, they found a positive association between the cost of equity and the precision of private information. Botosan *et al*. (2004) also found a positive association between public and private information precision and showed that the magnitude of the reduction in the cost of equity as a result of more precise public information is more than offset by the increase in the cost of equity as a result of more precise private information.

Cormier *et al.* (2009) studied the effect of corporate website disclosures on the earnings valuation multiple (ratio between share price and earnings per share) for a Canadian sample, involving only the largest non-financial companies. The authors found no association between the total disclosure score and the earnings valuation multiple (also known as the price-to-earnings ratio).

In a further analysis of the type of disclosure,[55] Cormier *et al.* (2009) found a negative relationship for financially related disclosures, a positive association for socially related disclosures and no association for business-related disclosures. As the inverse of the price-to-earnings ratio could also be used as a proxy for the cost of equity (see Section 2.6), the positive association between socially related disclosure and the multiple could be interpreted as a negative association between disclosure

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[54] All publicly traded companies in the US are required to file a 10-K report each year with the SEC. The 10-K report is similar to the annual report, except that it includes more detailed information about the business, finances and management of the company compared to the annual report. It, for example, includes the bylaws of the company, other legal documents, and information about any lawsuits in which the company may be involved (source: http://www.investorwords.com/2/10_K.html).

[55] Principal component factor analysis was used to assess disclosure patterns across companies. Using 0.5 as their cut-off for component matrix coefficients, three factors emerged: those related to financial, social and business aspects.

and the cost of equity, as opposed to the unexpected positive association between financially related disclosure and the cost of equity. Cormier *et al*. (2009) argued that a possible reason for the counterintuitive association was that their measure of financially related disclosures contained many elements that were related to companies' risk profiles.

Liu and De Villiers (2011) found a positive association between their disclosure proxy that was based on the KPMG International Survey of Corporate Social Responsibility Reporting and the cost of equity for a sample including UK and Australian listed companies. These authors offered two possible reasons for the positive association. The first possible reason was that the reporting of social responsibility information allows superior judgement to result in an increased cost of equity. The second reason was that the costs of disclosing the information may exceed the benefits thereof, resulting in an increased cost of equity.

Similar findings were reported by Dhaliwal, Tsang and Yang (2011), who used the initiation of the corporate social responsibility report as disclosure proxy in studying the association with the cost of equity for a US sample. The authors found a positive association between the cost of equity and the release of a corporate social responsibility report. Based on rankings of the reports, they, however, found that companies that achieve rankings superior to their industry peers benefit from a reduction in their cost of equity after issuing the reports.

Eugster (2014) relied on annual report ratings, as issued by the Department of Banking and Finance, University of Zurich in Switzerland, as disclosure proxy. This author found no association between disclosure and the cost of equity.

2.5.3 Relationship between disclosure, information asymmetry and the cost of equity

Bhattacharya *et al.* (2007) studied the relationship between earnings quality, information asymmetry and the cost of equity for a US sample, using three proxies for earnings quality: accruals quality, absolute normal returns and earnings variability. Using path analysis, the authors found statistically reliable evidence of both a direct and indirect path between earnings quality and the cost of equity.

According to the direct path, earnings quality directly affects the cost of equity, compared to the indirect path where earnings quality affects the cost of equity through information asymmetry. Bhattacharya *et al.* (2007) further found that the direct path dominates the indirect path and that the importance of the indirect path is sensitive to the measurement of information asymmetry (PIN and bid-ask spread). Their results therefore suggest that the amount of information risk (i.e. earnings quality) is more important than the distribution thereof (i.e. information asymmetry).

Armstrong *et al*. (2011: 4) stated that, in an imperfect competition setting,[56] the cost of equity is higher for companies with high information asymmetry than for companies with lower information

[56] Armstrong *et al*. (2011: 3) used the number of investors in a company as a proxy for the level of competition for a company's shares, with a high number of investors indicating a perfect competition setting and a low number an imperfect competition setting.

asymmetry. However, in a perfect competitive setting, there is no difference between low and high information asymmetry.

Gow *et al*. (2011) examined the relationship between disclosure precision, information asymmetry and the cost of capital in perfect and less than perfect market settings, using earnings announcements as proxies for disclosure precision. Using a US sample, these authors found that in a perfect market setting, disclosure affects the cost of capital through information precision. In less than perfect markets, disclosure affects cost of capital through information asymmetry and information precision. They further found that the relationship between information precision and information asymmetry could either be countervailing or reinforcing, and that disclosure could therefore either have a positive or negative association with information asymmetry and the cost of capital.

In a similar vein, Akins, Ng and Verdi (2012) studied the relationship between information asymmetry, information quality and the cost of equity using a US sample. They found that the pricing of information asymmetry on the cost of equity (i.e. whether cost of equity increases with increased levels of information asymmetry) decreases when there is more competition among informed investors.[57] Their findings were based on the underlying theory that increased competition among informed investors' results in private information being incorporated into prices more rapidly.

Akins *et al.* (2012) further argued that information quality (i.e. accruals quality and earnings smoothness) is also priced, as poor quality is associated with higher information asymmetry. Consistent with their findings on the pricing of information asymmetry, they reported results that indicate that the pricing of information quality also decreases when there is more competition among informed investors.

2.6 COST OF EQUITY ESTIMATES

Cost of capital is calculated as the weighted average (according to the composition of a company's capital structure) of the cost of equity and the cost of debt and is central to a variety of investment and financing decisions. Cost of equity is the rate of return required by shareholders before they invest in a company, while cost of debt is the cost at which a company may borrow money. Cost of equity estimates is discussed in Section 2.6 and cost of debt estimates in Section 2.7.

According to Joos (2000: 125), it is not possible to proxy the cost of equity in either an objective or direct way. The empirical studies of Froidevaux (2004: 56), which compare alternative cost of equity models in terms of superiority, showed mixed results on which model is practically the most valid.

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[57] To measure competition among informed investors, a measure of competition was constructed that was based on the number of total institutional investors, the percentage shares held by institutional investors and a Herfindahl index of competition that captures both the level and the distribution of institutional ownership.

For the purpose of the literature review, cost of equity estimates are categorised into two groups. The first category is based on analyst forecasts and includes methods such as the dividend discount, residual income, and discounted free cash flow models. The second category is based on share returns and includes methods such as realised returns, the CAPM, Fama-French three-factor model, and the earnings-to-price ratio. In a similar way, Froidevaux (2004: 44) distinguished between *ex ante* and *ex post* estimates of the cost of equity, *ex ante* being the analyst forecast-based estimates and *ex post* the methods based on share returns. According to PwC (2015: 42), there are two broad approaches to estimate the cost of equity: deductive models (e.g. dividend growth models) and risk-return models (e.g. the CAPM).

2.6.1 Analyst forecast-based estimates

In the view of Orens *et al.* (2010: 1064), all implied cost of equity models available in the literature are based on a variation of either the residual income or the dividend discount model. Lundholm and O'Keefe (2001a, b) stated that the dividend discount model, the discounted cash flow model and the residual income model are all equivalent from a theoretical point of view and only differ in the definition of the relevant cash flow to discount. According to these authors, it is further possible to distinguish between single-stage and multi-stage models. Single-stage models assume a constant future dividend or earnings growth rate, compared to multi-stage models that are based on the assumption that the company will experience different growth phases.

2.6.1.1 Single-stage models

The Chartered Institute of Management Accountants (CIMA) (CIMA, 2014: 34) asserted that the cost of equity for a company can be estimated using the dividend discount model on the assumption that the market value of a share is directly related to the expected future dividends from the shares.

The 'no growth' model is the simplest estimate of the cost of equity and is based on a zero dividend growth assumption. According to this model, the cost of equity (k_e) can be estimated using the following formula:

$$k_e = \frac{d_0}{P_0} \tag{2.6}$$

where:

d_0 = the annual dividend per share; and

P_0 = ex-dividend share price.

The perpetuity model (known as the Gordon growth model) assumes constant growth in perpetuity and estimates the cost of equity (k_e) using the following formula:

$$k_e = \frac{d_0(1+g)}{P_0} + g \tag{2.7}$$

where:

d_0 = the annual dividend per share;

P_0 = the ex-dividend share price; and

g = the growth rate.

According to CIMA (2014: 36), two methods can be used to estimate the growth rate: an analysis of the historical growth in dividends or a growth approximation. The growth approximation (g) is estimated using the following formula:

$$g = br \tag{2.8}$$

where:

b = the proportion of profits that are retained; and

r = the rate of return on new investments.

Omran and Pointon (2004: 243) cast the dividend growth model in terms of earnings and used the following formula as cost of equity (k_e) proxy:

$$k_e = (\frac{1}{PE\ ratio)}\left[1 - \frac{e_0 - d_0}{e_0}\right](1+g) + g \tag{2.9}$$

where:

d_0 = the annual dividend per share;

e_0 = the earnings per share; and

g = the growth rate.

2.6.1.2 Multi-stage models

The residual income model and the discounted free cash flow model are both multi-stage models. Plenborg (2002: 306) defines residual income as the difference between the return on equity, and the book value of equity multiplied by the cost of equity (i.e. the income generated by a company after accounting for its cost of equity).

By using the residual income model, the share price can be broken down into its book value and the present values of its expected future residual income as per the following formula:

$$V_0 = BV_0 + \left[\frac{RI1}{(1+r)^1} + \frac{RI2}{(1+r)^2} + \cdots\right] \quad (2.10)$$

where:

V_0 = the share price;

BV = the book value;

RI = the residual income; and

r = the cost of equity.

A clear advantage of the residual income model is that dividend payments and cash flows are not used. The model is therefore also applicable to companies that do not pay dividends, as well as companies that do not generate a positive cash flow.

Hail (2002: 747) proposed the following residual income model to estimate the cost of equity:

$$V_t = BV_t + \sum_{t=1}^{\infty} Et\left[\frac{(PROF_t+\tau-r)bvt+\tau-1}{(1+r)^{\tau}}\right] \quad (2.11)$$

where:

V_t = the 'intrinsic' value of the company;

BV = the book value;

E_t = the expected value operator; and

$PROF$ = the after-tax return on the book value of equity.

Hail (2002: 748) adopted a three-stage approach: a short-term period using earnings forecasts for the following three years, a medium-term fading period where the return on book value of equity is faded to the median market return, and the calculation of a terminal value by assuming the latest residual income as a perpetuity. The implied discount rate is consequently calculated as an estimate of the *ex ante* cost of equity capital.

A multi-stage discounted free cash flow method was used by Froidevaux (2004: 58), assuming three stages of growth: an initial growth period, a transition growth period and a long-term mature growth period (terminal value). Botosan and Plumlee (2005: 21-23) assessed five different methods for calculating the cost of equity. The five methods examined differ primarily with respect to their terminal value assumptions.

2.6.2 Share return-based estimates

2.6.2.1 Inverse of the price-to-earnings ratio

According to Omran and Pointon (2004: 243), the inverse of the price-to-earnings ratio (also known as the earnings-to-price ratio) is the simplest model to estimate the cost of equity. Liu, Nissim and Thomas (2002) and Francis, LaFond, Olsson and Schipper (2005b) stated that a higher price-to-earnings multiple implies a lower cost of equity, as investors are willing to pay more for a given dollar of earnings. A disadvantage of this method is, however, the difficulty of interpreting a negative ratio. As a consequence, Fu *et al.* (2012) and Francis *et al*. (2005b) did not use this ratio for non-profitable companies.

According to this method, the cost of equity (k_e) is estimated using the following formula:

$$k_e = \frac{1}{PE\ ratio} \tag{2.12}$$

where:

$PE\ ratio$ = the price-to-earnings ratio.

2.6.2.2 Capital asset pricing model (CAPM)

Although the CAPM is often criticised in the literature, for example by Omran & Pointon (2004) and Hail (2002), a recent valuation methodology survey by PwC (2015) found the CAPM to be the most preferred method among survey participants to estimate the cost of equity. Of the survey participants, 86% indicated that they 'always' use the CAPM, while 11% indicated that they 'frequently' use the CAPM. Regarding the use of deductive models (e.g. dividend growth models), no participants indicated that they 'always' use these models, while 11% indicated that they 'frequently' use them, and 49% 'sometimes' and 40% 'never' use these models.

The CAPM estimates the cost of equity (k_e) using the following formula:

$$k_e = R_f + ß\ (R_m - R_f) \tag{2.13}$$

where:

R_f = the risk free rate;

ß = the beta; and

R_m = the market return.

2.6.2.3 Fama-French three-factor and five-factor model

The Fama-French three factor model expands on the CAPM by adding size and market-to-book ratio as two additional factors to market risk in the CAPM. This model was developed by Eugene Fama and Kenneth French based on the underlying assumption that two classes of shares tend to

outperform the market: small market capitalisation companies and shares with a low market-to-book ratio (also referred to as value shares).

Basiewicz and Auret (2010) tested the feasibility of the Fama-French free-factor model in explaining share returns on the JSE. Their results provided empirical support for the use of the model to estimate the expected returns for JSE-listed companies. Fu *et al.* (2012) used this model to estimate cost of equity. In 2015, Fama and French extended the three-factor model by adding two further factors, profitability and investment (Fama & French, 2015).

2.6.2.4 Realised returns

Gebhardt, Lee and Swaminathan (2001) suggested that *ex post* realised returns should be an unbiased estimator of the unobservable cost of equity in an efficient market. Although Fu *et al.* (2012) admitted that realised returns are a noisy measure of the cost of equity, they include realised returns in their study as a cost of equity proxy owing to its theoretical appeal.

2.7 COST OF DEBT ESTIMATES

The cost of capital is calculated as the weighted average (according to the composition of a company's capital structure) of the cost of equity and the cost of debt. The cost of equity was discussed in Section 2.6.

Cost of debt is the cost at which a company may borrow money. Sengupta (1998) and Nikolaev and Van Lent (2005) used the effective yield to maturity (YIELD) of bonds as their measure of the cost of capital. Nikolaev and Van Lent (2005) defined YIELD as the discount rate that equates the current value of all future interest and principle payments to the capital provided by the lender at the moment of the bond issue.

Guidara *et al.* (2014), Orens *et al.* (2010) and Sengupta (1998) measured the cost of debt (CoD) using the following formula:

$$CoD = \frac{Interest\ expense\ for\ the\ year}{Short\ and\ long\ term\ liabilities\ at\ the\ beginning\ of\ the\ year} \tag{2.14}$$

2.8 ENDOGENEITY

According to Hill, Griffiths and Lim (2011: 405), the ordinary least square (OLS) regression model fails in the presence of a correlation between an independent variable and the error term. This independent variable is said to be endogenous and the literature refers to this as an 'endogeneity problem'. Among others, Welker (1995), Leuz and Verrechia (2000), Core (2001), Hail (2002), Chang *et al.* (2008), Nikolaev and van Lent (2005), Orens *et al.* (2010) and Eugster (2014) have cautioned that disclosure should be treated as an endogenous variable when studying the effects of voluntary disclosure on information asymmetry, the cost of equity and the cost of debt. If not accounted for, the endogeneity problem will result in spurious results and incorrect conclusions. Hill *et al.* (2011:

405) listed three possible causes of the endogeneity problem: simultaneous equations bias,[58] omitted variables, and measurement error.

Earlier in this chapter, theories that could explain variations in disclosure levels were discussed. Specifically, the cost–benefit analysis theory was discussed in Section 2.2.6. According to this theory, the level of IIR will depend upon the outcome of a cost–benefit assessment. Welker (1995: 803), Leuz and Verrechia (2000: 100), Hail (2002: 746), Cheng *et al.* (2006: 48) and Orens *et al.* (2010: 1072) all argued that companies may choose their disclosure strategy, and therefore level of IIR, by considering the costs and benefits thereof.

Eugster (2014: 1) argued that a current high cost of equity may encourage management to increase voluntary disclosure in the future based on a cost–benefit analysis. Dye (1985) developed a theoretical model in which the level of disclosure depends upon the information asymmetry between management and investors. Welker (1995) also argued that uninformed traders perceptions of the adverse selection problem may depend on the companies' disclosure policy.

Eugster (2014: 1) pointed out that the level of voluntary disclosure may merely be a symptom of an unobserved factor, for example managerial ability. Lack of managerial ability may therefore explain both decreased levels of IIR and increased levels of the cost of equity. Investigating the association between reporting frequency and information asymmetry, Fu *et al.* (2012) emphasised that the decision to voluntarily report more frequently is not likely to be random. They argued that it is possible that some unobservable company characteristic, such as risk, may affect both reporting frequency and information asymmetry.

Although some disclosure studies, such as Healy *et al.* (1999), either did not consider, test or report an endogeneity concern in their studies, most disclosure studies that examined the association with information asymmetry or the cost of capital did discuss and/or correct endogeneity.

The Hausman test is often used in literature to test for the existence of endogeneity. Heflin *et al.* (2005)[59], Orens *et al.* (2010)[60] and Fu *et al.* (2012)[61] used the Hausman test to confirm the existence of endogeneity. Cheng *et al.* (2006)[62] and Gajewski and Li (2015),[63] on the other hand, reported test results that indicate the absence of endogeneity.

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[58] Also referred to in the literature as reverse causality or a self-selection bias.
[59] Heflin *et al.* (2005) examined the relationship between disclosure and, in turn, the bid-ask spread and quoted depths. The 2SLS approach was followed to correct for endogeneity.
[60] Orens *et al.* (2010) examined the relationship between corporate website disclosure and, in turn, the bid-ask spread, cost of equity and cost of debt. The 2SLS approach was followed to correct for endogeneity.
[61] Fu *et al.* (2012) examined the relationship between the frequency of financial reporting (i.e. quarterly and interim reporting) and, in turn, the bid-ask spread and price impact. The 2SLS approach was followed to correct for endogeneity.
[62] Cheng *et al.* (2006) examined the relationship between the level of annual report voluntary disclosure and, in turn, the bid-ask spread, trading volume and price volatility. Although the Hausman test confirmed the absence of endogeneity, the authors used 3SLS to confirm their OLS results.
[63] Gajewski and Li (2015) examined the relationship between corporate website disclosure and five information asymmetry proxies.

Some studies, found a stronger association between disclosure and each of the following: information asymmetry, cost of debt and the cost of equity, after controlling for endogeneity. Nikolaev and Van Lent (2005) used panel data techniques to address endogeneity concerns and found that the effect of disclosure policy on the cost of debt is 200% higher than the percentage found in an OLS estimation.

Similar to Nikolaev and Van Lent (2005), Orens *et al.* (2010) found a stronger negative association (in terms of the coefficient) between their proxy for disclosure and, in turn, the bid-ask spread, cost of equity and cost of debt in the 2SLS model as compared to the OLS models.[64] For the trading volume regression model, however, the sign and the statistical significance of disclosure as explanatory variable for trading volume differed between the OLS and the 2SLS models. In the OLS regression model the disclosure coefficient was negative and not statistically significant, but in the 2SLS regression model the coefficient was positive (as expected) and statistically significant at the 5% level.

Fu *et al.* (2012), on the other hand, found stronger associations (in terms of the coefficient) between their proxy for disclosure, reporting frequency, and, in turn, their two proxies for information asymmetry and four proxies for the cost of equity in the OLS compared to the 2SLS models.[65]

Chang *et al.* (2008) found a positive and not statistically significant association between their proxy for disclosure, IIR, and spread for both the OLS and the 2SLS regression models.

2.8.1 Instrumental variables

To do the Hausman test, an instrumental variable is needed first. According to Hill *et al*. (2011: 410), an instrumental variable should have no correlation with both the dependent variable and the regression error, but should be correlated with the endogenous independent variable. Instrumental variable analysis is implemented using a two-step process (Hill *et al*., 2011: 412). The first regression stage will have the endogenous independent variable as dependent variable with all the exogenous and instrumental variables as independent variables. The fitted value for the endogenous variable obtained from the first-stage regression is a weighted average or a linear combination of all the exogenous and instrumental variables (Hill *et al.,* 2011: 412) and will replace the endogenous independent variable in the second-stage regression.

In econometrics the least square estimators from the second regression are known as the instrumental variable (IV) or two-stage least square (2SLS) estimators (Hill *et al*., 2011: 412).

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[64] For the bid-ask spread, the disclosure score coefficient reported by OLS is -0.002 compared to -0.009 for the 2SLS, both significant at the 1% level. Similarly, for the cost of equity regression model, the disclosure coefficient is -0.022 for OLS and -0.051 for 2SLS, but the 2SLS coefficient is slightly less significant (5%) compared to the OLS (1%). For the cost of debt regression model, the disclosure coefficient is -0.008 for OLS and -0.014 for 2SLS, both significant at 5%.

[65] For the bid-ask spread, the disclosure score coefficient reported by OLS is -0.146 compared to -0.085 for the 2SLS. Similarly, for the price impact model, a disclosure coefficient of -0.382 is reported by OLS and -0.216 for the 2SLS.

Orens *et al.* (2010: 1072) used the 2SLS method and described the process followed as follows:

> The first stage of the 2SLS method estimates the extent of non-financial disclosure on the basis of exogenous variables of the cost of finance equations together with instrumental variables. The second stage relates the estimated value of extent of disclosure to the cost of finance proxies.

Fu *et al.* (2012: 10) describe the 2SLS method as follows:

> In the first-stage regression, the dependent variable is the observed reporting frequency and the independent variables include the instrumental variable and control variables in the original OLS model. We obtain the predicted reporting frequency from the first-stage regression results. The predicted reporting frequency replaces the observed reporting frequency in the second-stage regression.

According to Fu *et al.* (2012), the success of the 2SLS model to control for endogeneity depends critically on the quality of the instrumental variable. Larcker and Rusticus (2010) showed that instrumental variables that are of low quality are actually more likely to provide the wrong statistical inference than simple OLS estimates that make no correction for endogeneity.

Various types of instrumental variables have been used in literature for the endogenous disclosure variable, for example capital intensity and media exposure (Orens *et al.,* 2010), the year index (Fu *et al.,* 2012) and board structure (i.e. one-tier or two-tier) (Gajewski & Li, 2015).

2.8.2 Simultaneous equations approach

A common issue with the use of the simultaneous equations approach is the identification of appropriate exogenous variables to specify each equation (Chang *et al.,* 2008: 381). If the exogenous variables are correlated with both dependent variables, the results will be biased (Brown & Hillegeist, 2007). Welker (1995: 817) used the simultaneous equations approach and described the processed followed as follows:

> In the first stage, each endogenous variable (S/P and DISQ) is regressed on all exogenous variables included in the model (SDRET, DOLVOL, PRICE, LOWPRICE, HIPRICE, RET and OFFER) to form a predicted value for the endogenous variable. The predicted values of S/P and DISC, which should exhibit less correlation with the error term, are then used as the explanatory variables in the second stage regressions that estimate equations (3) and (4). The result of this substitution is that the endogenous variables included as explanatory variables include only that portion of the variation of the original variable that is explained by the instruments.

Leuz and Verrechia (2010: 109) use the 2SLS model as well as the simultaneous equations approach, with the latter as robustness check.

2.8.3 Impact threshold for confounding variable

Agarwal *et al.* (2016: 44) and Fu *et al.* (2012) calculate the impact threshold for a confounding variable (ITCV). According to Fu *et al.* (2012), the ITCV is an assessment of how severe the endogeneity problem must be to overturn the OLS results. The higher the ITCV, the more robust the OLS is to endogeneity. Both Agarwal *et al.* (2016) and Fu *et al.* (2012) have argued that the ITCV values calculated in their studies are large enough to ensure that any potential endogeneity between their independent and dependent variables is unlikely to have a severe impact on their results and conclusions.

2.8.4 Firm fixed effects model

A firm fixed effect model assumes that the unobservable company characteristics that affect both the dependent (i.e. information asymmetry or cost of capital) and independent (i.e. disclosure) variables are constant over time. Fu *et al.* (2012) used the firm fixed effect model as one of three models to control for endogeneity and documented similar results over all three models (i.e. firm fixed effects, 2SLS, and matched control sample).

2.8.5 Matched control sample

The matched control sample compares changes in information asymmetry and cost of capital between companies that have changed their reporting frequency and those that have not (Fu *et al.,* 2012). As discussed in Section 2.8.4, Fu *et al.* (2012) reported similar results using the matched control sample, firm fixed effects and 2SLS models in controlling for endogeneity.

2.9 SUMMARY AND CONCLUSION

As discussed in Chapter 1, IIR is defined to include various information types (e.g. mandatory and voluntary disclosures), as well as shareholder services to facilitate shareholder relationships. Notwithstanding the fact that IIR will therefore also include mandatory information types, for example the annual report, the use of IIR by companies is a purely voluntary decision.

Various theories were used in the literature to explain voluntary disclosure, and therefore IIR, levels. The following theories were discussed in this Chapter: agency problem, information problem, signalling theory, investor recognition hypothesis, the follower's effect, and the cost–benefit analysis theory. These theories were used in past studies to develop and to test for explanatory variables that best explain variations in disclosure levels between companies. These studies are discussed further in Chapter 5. The purpose of Chapter 5 is to address the third research objective set for this study, namely to develop to establish the determinants of IIR by means of a regression model.

According to the cost–benefit analysis theory, the amount and type of disclosure depends upon the outcome of a cost–benefit assessment. The studies presented from the literature discuss various potential benefits of increased disclosure levels. Given the research problem and research

question 3,[66] as discussed in Chapter 1, the literature review focused on studies that have examined the relationship between disclosure, information asymmetry, cost of equity and the cost of debt. The majority of these studies were performed in developed countries and mixed results were reported. Various reasons were offered in past studies to explain these mixed results, such as different country settings, endogeneity and different proxies used to estimate the following: disclosure, information asymmetry, cost of debt and the cost of equity.

Different proxies that could be used to estimate information asymmetry, cost of equity and cost of debt were briefly discussed in this chapter, but the different proxies that were used to measure disclosure will be discussed in the next chapter.

As mentioned in the discussion on the cost–benefit analysis theory in Section 2.2.6 of this chapter, it is often raised in the literature that companies may choose their disclosure strategy by considering the costs and benefits thereof. If this is done, however, it could cause an endogeneity problem. The endogeneity problem was discussed in Section 2.8, along with methods used in the literature to test for and remedy this problem.

[66] The third research question is: Will variations in IIR have an effect on the level of information asymmetry and cost of capital?

CHAPTER 3
DATA COLLECTION INSTRUMENT

Not everything that counts can be counted, and not everything that can be counted counts.[67]

3.1 INTRODUCTION

The research problem of this study, as discussed in Chapter 1, is whether or not, variations in IIR between companies will have any effect, positive or negative, on the level of information asymmetry and cost of capital. Accordingly, the first research question for this study was: *to what extent do JSE-listed companies use corporate websites to communicate with investors?* Two research objectives were set in Chapter 1 to answer this research question: first, to develop an appropriate measurement instrument, and, second, to measure the extent of IIR scores for a sample of JSE-listed companies. The purpose of this chapter is to develop and describe the measurement instrument.

As briefly discussed in Chapter 2, Section 2.9, different disclosure proxies are often argued to be one of the reasons for conflicting empirical results. As discussed in Chapter 1, disclosure is an umbrella term and can refer to a range of different items. According to Hassan and Marston (2010: 3), disclosure is a theoretical concept or latent variable that is difficult to measure directly. Disclosure can be measured in a number of ways, as is evident from prior studies. Hassan and Marston (2010: 9) categorised disclosure proxies in two broad categories. The first approach used a proxy for disclosure, which was not directly based on examining the original disclosure vehicle compared to the second approach that involved an examination of the original disclosure vehicle. This thesis referred to the first approach as indirect disclosure proxies and the second as direct disclosure proxies.

Both direct and indirect disclosure proxies are often criticised in literature for a number of reasons. Specific weaknesses and advantages of both direct and indirect disclosure proxies are discussed in Section 3.2. As no reliable analyst ratings suitable for use in this study exist in South Africa and owing to the inherent shortcomings and diversity of existing measurement instruments, this dissertation elected to use a self-constructed measurement instrument based on the Investor Relations Society (IRS) best practices, a comprehensive literature review and a pilot study for the purposes of this study.

The remainder of this chapter will discuss disclosure proxies, including existing measurement instruments (Section 3.2); the methodology followed in the development of the instrument (Section 3.3); the results of the Esterhuyse and Wingard (2016)[68] study (Section 3.4) and, finally, a chapter summary (Section 3.5).

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[67] Albert Einstein.

[68] This study was published too late to be included in the literature review process that was followed to develop the measurement instrument used in this study and is therefore also not included in Table B1, Annexure B. The inclusion of

3.2 LITERATURE REVIEW OF DISCLOSURE PROXIES AND EXISTING INSTRUMENTS

As discussed in Section 3.1, disclosure studies can be categorised into two broad categories based on the disclosure proxy used: direct or indirect. Table 3.1 summarises the disclosure proxies that were used by indirect disclosure proxy studies.

Table 3.1: Indirect disclosure proxies used in the disclosure literature

Proxy used	Study
Association for Investment Management and Research (AIMR) ratings	Botosan and Plumlee (2002); Welker (1995); Healy *et al.* (1999); Brown and Hillegeist (2007)
Investor Relations Magazine nominations	Agarwal *et al.* (2016)
Financial Analyst Federation (FAF) ratings	Heflin *et al.* (2005)
Switch German to US GAAP	Leuz and Verrechia (2000)
Centre for International Financial Analysis and Research (CIFAR) ratings	Francis *et al.* (2005a)
Moody's ratings	Fu *et al.* (2012)
Society of Management Accountants of Canada (SMAC) / University of Quebec at Montreal (UQAM)	Richardson and Welker (2001)
Swiss Banking Institute (SBI)	Hail (2002)
KLD Research & Analytics	Dhaliwal *et al.* (2011)
KPMG ratings	Liu and De Villiers (2011)

Botosan and Plumlee (2002: 22) and Brown and Hillegeist (2007) used ratings based on the opinions of expert users (i.e. analysts), as published by the Association for Investment Management and Research (AIMR). AIMR ratings[69] are based on analyst ratings of aggregate disclosure (mandatory and voluntary) (Hassan & Marston, 2010) within three categories: (1) annual report and the form 10-K (a report required by the SEC), (2) interim reports and other publications and (3) analyst and investor relations publications (Healy *et al.*, 1999: 496).

Given the laborious nature of using a direct disclosure proxy, such as content analysis using measurement instruments, indirect disclosure proxies are often used in studies. When comparing

this study in the earlier literature review would not have made a difference in the attributes that were included in the instrument as used in this study. Using the measurement instrument developed in this study, company websites were measured over a six-month period between March and September 2015.

[69] AIMR was discontinued in 1997.

and discussing sample sizes, studies should therefore be categorised according to the proxy used for disclosure. Analyst ratings (i.e. indirect disclosure proxies) are often criticised in the literature for the following three reasons:

- Sample bias

According to Eugster (2014), the AIMR rating covers mainly larger companies. Welker (1995) admitted that his results should be interpreted as applying to larger companies only. According to Welker (1995: 811), this weakened the power of his empirical tests to the extent that this selection bias reduced the cross-sectional variation in disclosure and spreads.

- Analyst bias

Healy *et al.* (1999: 489) admitted that if analysts' ratings were influenced by less relevant considerations (e.g. performance, own interest, relationship with management, etc.) instead of disclosure, these ratings may not be a reliable proxy for disclosure.

- Small investor relations component

According to Agarwal *et al.* (2016: 32), the investor relations component contributed only 20–30% of the total AIMR rating and may therefore not be a reliable measure of investor relations.

According to Cheng *et al.* (2006: 38), ratings by the Centre for International Financial Analysis and Research (CIFAR) evaluated both mandatory and voluntary disclosure and were therefore not suitable proxies for voluntary disclosure.

It should also be noted that many of these ratings are only available for one country (e.g. AIMR) which inhibits comparison studies. All AIMR studies in Table 3.1 were, for example, developed using a US sample.

On the other hand, it can also be argued that AIMR analysts' ratings provide a comprehensive measure of disclosure, reflecting the quality of both formal (e.g. annual reports) and informal (e.g. management presentations at analyst meetings) disclosures and also reflect the expertise and experience of top financial analysts (Healy *et al.,* 1999: 491).

Direct disclosure proxy studies involve the examination of the original disclosure vehicle, which implies using a measurement instrument and doing a content analysis. Healy and Palepu (2001: 426-427) argued that self-constructed measurement instruments have the following potential weaknesses:

- Findings may be difficult to replicate given judgement on the part of the researcher in performing the measurements;
- Only the specific disclosure medium (e.g. annual report) is studied and disclosures that are provided in other mediums (e.g. analyst meetings, conference calls, etc.) are omitted or the

content of the specific medium is studied without considering that the same information may also be available from other sources; and

- Endogeneity.[70]

Trabelsi *et al.* (2008) identified three additional weaknesses of measurement instruments from prior studies that have examined corporate websites as disclosure medium:

- The use of dichotomous or ordinal variables which could reduce cross-sectional variability;
- Too much emphasis on the website design (presentation format) over the actual content; and
- Important variables are ignored.

Contrary to the second weakness listed above by Trabelsi *et al.* (2008), Hamid (2005: 12) emphasises the omission of information technology attributes (presentation format) in prior measurement instruments, as a weakness.

According to Froidevaux (2004: 53), disclosure level is not easily assessed because the development of any measurement instrument relies heavily on a person's subjective perception. The solution proposed by Froidevaux was to include as many variables as possible in the measurement instrument used.

Francis *et al.* (2008: 62-63), on the other hand, listed the following advantages of using a self-constructed measurement instrument:

- Increased confidence that the metric captures what it is intended to capture; and
- Any company can be included in the sample. Alternatively, the sample may be limited to companies selected by external data providers which usually include only the larger companies.

Direct disclosure proxy studies can be further classified in terms of the disclosure medium studied (e.g. annual report or corporate website). For the purposes of this literature review, direct disclosure proxy studies that examine corporate websites are further classified according to a number of study characteristics. These characteristics are: the study purpose (Section 3.2.1), the attributes measured and categories used (Section 3.2.2), the use of weights (Section 3.2.3), a distinction or not between the quantity and quality of disclosure (Section 3.2.4), the sample selection criteria (Section 3.2.5), how the content analysis was done (Section 3.2.6), how the disclosure score was calculated (Section 3.2.7) and whether reliability and validity tests were done and reported (Section 3.2.8).

The purpose of this literature review is to discuss each of these characteristics in order to emphasise the shortcomings and diversity of existing measurement instruments, but also to provide the

[70] See Section 2.8 for a detailed discussion of endogeneity.

foundation for the development of the methodology that was used in this study to develop the measurement instrument.

3.2.1 Study purpose according to article titles

How literature refers to disclosure in the article title can be used as a rough indication of the purpose of each study. The wide variety of article titles used in previous disclosure studies point to the diversity of these studies. Extracts of how literature referred to disclosure in their article titles are presented in Table 3.2 below. Table 3.2 also categorises the literature into three categories, namely: descriptive, determinant or effect. The difference between descriptive, determinant and effect studies were discussed in Section 2.1. All studies included in Table 3.2 examine the corporate website as disclosure vehicle.

Considering the wide definition of investor relations, the abbreviation IIR, as discussed in Chapter 1, will, for practical reasons, be used throughout the remainder of this dissertation to refer to all studies that have examined corporate websites as a disclosure vehicle.

Table 3.2: Key words used in the literature to refer to disclosure in article titles

Key words extracted from the titles of studies that have examined corporate websites	Authors and categories of studies that have examined corporate websites
Internet financial reporting; Financial reporting on the internet; Financial information on the internet; Financial disclosure on corporate websites; Corporate financial reporting on the internet; Financial data at corporate websites	Descriptive: Debreceny, Gray and Mock (2001); Fisher, Oyelere and Laswad (2002); Jones and Xiao (2004); Barac (2004); Trabelsi, Labelle and Laurin (2004); Khan (2006); Khan (2007); Mohammed, Oyelere and Al-Busaidi (2009); Khan and Ismail (2012); Nel (2004); Turel (2010); Ali (2010) Determinant: Pirchegger and Wagenhofer (1999); Craven and Marston (1999); Ettredge, Richardson and Scholz (1999); Debreceny *et al*. (2002); Allym and Lymer (2003); Oyelere, Laswad and Fischer (2003); Prabowa and Tambotoh (2005); Pervan (2006); Kelton and Yang (2008); Almilia (2009) Effect: Kelton (2006); Kelton and Pennington (2012); Lai *et al*. (2010)
Internet investor relations; Investor relations on the internet; Investor relations; Investor relations websites; Use of internet for investor relations; Use of corporate websites for investor relations; Information for investors at corporate websites; Online investor relations	Descriptive: Hedlin (1999); Deller *et al*. (1999); Brennan and Kelly (2000); Loxton (2003)[71]; Hamid (2005); Africanir (2010); Sabelfeld (2011); Dordevic, Dordevic and Stanujkic (2012); Esterhuyse and Wingard (2016) Determinant: Geerings *et al*. (2003); Bollen, Hassink and Bozic (2006); Ryan (2010); AbuGhazaleh, Qasim and Haddad (2012); Ettredge *et al*. (2002) Effect: Froidevaux (2004); Chang *et al*. (2008); Chang, Hooi and Wee (2014)

[71] Loxton's Afrikaans title is 'Beleggersverhoudinge op die Internet' which, translated into English, is 'Investor Relations on the Internet'

Table 3.2: Key words used in the literature to refer to disclosure in article titles (continued)

Key words extracted from the titles of studies that have examined corporate websites	Authors and categories of studies that have examined corporate websites
Online financial reporting; Online reporting; Online corporate annual reports	Determinant: Lybaert (2002); Venter (2002); Hodge and Pronk (2006); Allam (2005); Serrano-Cinca, Fuertes-Callen and Gutierrez-Nieto (2007); Harper (2012)
Digital reporting formats; Digital reporting	Descriptive: Ghani, Laswad and Tooley (2009) Determinant: Bónson and Escobar (2006) Effect: Ghani, Laswad and Tooley (2011)
Corporate reporting on the internet; Corporate internet reporting; Use of internet for corporate reporting; Business reporting on the internet; Corporate governance and strategic information on the internet; Internet reporting; Internet-based disclosures; Internet-based disclosure	Descriptive: Lymer and Debreceny (2003); Davey and Homkajohn (2004); Lodhia, Allam and Lymer (2004); Spanos (2006); Chatterjee and Hawkes (2008); Barac (2004); Khadaroo (2005) Determinant: Ashbaugh, Johnstone and Warfield (1999); Bonsón and Escobar (2002); Larrán and Giner (2002); Xiao *et al.* (2004); Marston and Polei (2004); Aly, Simon and Hussainey (2010); Lymer *et al.* (1999); Sánchez, Dominguez and Alvarez (2011); Abdelsalam *et al.* (2007); Abdelsalam and El-Masry (2008) Effect: Gajewski and Li (2015); Ahmed, Tahat, Burton and Dunne (2015)
Voluntary disclosure on corporate websites; Corporate website disclosures; Use of websites as disclosure platform; Corporate websites	Descriptive: Matherly and Burton (2005); Nel and Baard (2007); Jones (2009); Baard and Nel (2011) Determinant: Ettredge *et al.* (2001) Effect: Trabelsi *et al.* (2008); Cormier *et al.* (2009)
Web-based disclosure; Web-based non-financial disclosure; Web-based corporate performance disclosure; Web-based business reporting; Web-based financial statements; Web site disclosures	Descriptive: Beattie and Pratt (2003) Determinant: Celik, Ecer and Karabacak (2006) Effect: Dull, Graham and Baldwin (2003); Orens *et al.* (2010); Aerts *et al.* (2007); Epping and Wilder (2011)

3.2.2 Attributes measured and categories used

Some studies (e.g. Debreceny *et al.,* 2002; Oyelere *et al.,* 2003; Craven & Marston, 1999 and Ashbaugh, Johnstone & Warfield, 1999) measured only whether companies had a web presence and whether financial information (reports or summaries) were available on the website or not. Other studies (e.g. Hedlin, 1999; Lymer *et al*., 1999; Loxton, 2003 and Geerings *et al*., 2003; Esterhuyse & Wingard, 2016) used stages to classify the IIR practices of companies.

The majority of direct disclosure proxy studies divided measured attributes into categories. Categories that were used in direct disclosure measurement studies that examined corporate websites are summarised in Table 3.3.

Table 3.3: Categories used and number of attributes measured in disclosure studies

Categories used (number of attributes per category)	Study	Attributes
General items (25), Investor relations items (19), Annual report items (64), and other items (56)	Celik *et al.* (2006)	164
Financial performance (9), Corporate governance (17), Production efficiency (17), Innovation and development (10), Customer value (16), Human and intellectual capital (16), Social responsibility (16), Management information systems (2), and Website capabilities (8)	Cormier *et al.* (2009)	111
Corporate governance (17), Customer value (16), Human and intellectual capital (16), Production efficiency (17), Innovation, research and development, and growth (10), and Social responsibility (16)	Orens *et al.* (2010)	92
Summary of historical results (5), Projected information (9), Background information (16), Key non-financial statistics (20), Management discussion (13), Intangible assets (9), and Social and environmental information (7)	Trabelsi *et al.* (2008)	79
Content (investor) (30), Content (timeliness) (5), Content (social/environmental) (5), Content (contact details) (5), Presentation (technological features) (10), and Presentation (convenience/usability) (16)	Marston and Polei (2004)	71
Background (6), Financial (6), Ratio analysis (7), Share price/ shareholder (7), Press releases (2), Contact details/Investor related info (4), and FAQ (1)	Hamid (2005)	33
Background (4), Financial info (5), Share price, Shareholder info (7), Ratios (5), FAQ, Press releases (2), Contact details, Financial calendar (2), Analysts (2), and New IR activities (3)	Brennan and Kelly (2000)	30
Content (16), Timeliness (4), Technology (6), and User support (5)	Davey and Homkajohn (2004)	31
Annual/interim reports (9), Press releases/further information (6), Presentation advantages (7), Video/audio recordings (3), and Direct contact via email (4)	Bollen *et al.* (2006)	29
Fundamental reporting (6), Corporate Social Responsibility (2), Corporate Governance (6)	Khan (2007)	14
General attributes (10), Specific: financial reports (12), Specific: Investor related information (8), and Specific: board/ management (6)	Khadaroo (2005)	36
Business data (7), Forward-looking data (4), Convenience (10), Company background (6), and Intangibles (8)	Matherly and Burton (2005)	35
Financial information (31), Corporate governance (2), Social responsibility (3), Technological features (4), Convenience/usability (4), and Contact/other (7)	Turel (2010)	51
Content (15), Timeliness (8), Technology (14), and User support (14)	Pirchegger and Wagenhofer (1999)	51
Usability (7), Dialogue (3), General info (13), Financial information (8), Presentations (7), and Retail shareholders (9)	Wade and Forbes (2000)	47
Content (financial) (10), Content (investor) (9), Timeliness (8), Technology (8), and User support (9)	Lybaert (2002)	44

From Table 3.3, the range of categories, as well as the number of attributes measured, is evident. Some determinant and effect (i.e. information asymmetry and cost of capital) studies examined both total and category disclosure scores. Studies listed in Table 3.3 differ in respect to how attributes were categorised. For example, the *internal search function* attribute was categorised into navigation, general items, investor relations items, user support, technology, presentation advantages, and accessibility categories in existing literature.

According to Wallace, Naser and Mora (1994: 43) there is no general theory on how to build an index. Further to the number of attributes and the use of categories, attributes measured in direct disclosure proxy studies could be categorised as presentation or content (Section 3.2.2.1), mandatory or voluntary (Section 3.2.2.2), financial or non-financial (Section 3.2.2.3), and objective or subjective (Section 3.2.2.4) attributes.

3.2.2.1 Presentation versus content attributes

As discussed in Chapter 1, *content* refers to information and *presentation* to the use of presentation technologies. Many of the advantages of IIR, as discussed in Section 1.2.4 in Chapter 1, and as further discussed in this section, depend on the proper use of presentation technology-related attributes.

Marston and Polei (2004: 297) argued that although investors are mainly interested in the extent of information provided (i.e. content), they also want to find this information as quickly and easily as possible (i.e. presentation). Chang *et al.* (2008: 376) argued that the primary objective of investor relations is not necessarily the provision of information, but rather to improve the flow of information to investors.

Khadaroo (2005a: 64) argued that the presentation of information is important as it determines the ease of navigation of users and their ability to access relevant information of interest to them. In a 2007 Makinson Cowell Report (Loehnis, 2007), the two most important attributes of a corporate website were described as, firstly, being as comprehensive as possible (i.e. content) and, secondly, being easy to use and fast in terms of performance (i.e. presentation). According to Debreceny *et al.* (2002), presentation is important as it could potentially improve the timeliness and verifiability, and ultimately the quality and usefulness, of information.

Although the proper use of presentation technologies can enhance the usefulness of IIR, on the other hand, it can also compromise its usefulness if used inappropriately (as discussed in Section 1.2.5).

In the opinion of Wade and Forbes (2000: 8), the usability of IIR is often seen by institutional investors as a prerequisite hurdle to clear before they would engage in using corporate websites as an information source. According to research by Loehnis (2007), slow sites, poor navigation and outdated information irritate fund managers and analysts immensely. A 2009 update of the 2007

Loehnis study documented the increasing frustration of users on having to experience poor navigation, clutter and long chains of links to relevant information (Jones, 2009).

Xiao *et al.* (2004: 197) saw it as an important shortcoming of earlier studies on the use of Internet reporting that corporate website disclosure was treated as if it were just an electronic version of the hard copy annual report, i.e. ignoring the innovative aspect of the former and therefore the advantages available through the use of technology to communicate with investors. Although the majority of IIR studies include some presentation variables, they are mostly insignificant. Some studies, however, measured only content, such as Orens *et al.* (2010), Trabelsi *et al.* (2008), Aerts *et al.* (2007), Khan (2006), Khan (2007), Ali (2010) and Brennan and Kelly (2000). Table 3.4 list IIR studies reviewed in this study that have included more than 15% of presentation-related attributes.

Table 3.4: Presentation versus content-related attributes: corporate website studies

Study	Presentation-related attributes (percentage of total attributes)	Content-related attributes (percentage of total attributes)	Total attributes
Pirchegger and Wagenhofer (1999)	30 (59%)	21 (41%)	51
Lybaert (2002)	21 (49%)	22 (51%)	43
Davey and Homkajohn (2004)	12 (38%)	20 (62%)	32
Marston and Polei (2004)	25 (36%)	45 (64%)	70
Wade and Forbes (2000)	11 (24%)	35 (76%)	46
Geerings *et al.* (2003)	9 (31%)	20 (69%)	29
Bollen *et al.* (2006)	9 (31%)	20 (69%)	29
Celik *et al.* (2006)	24 (15%)	138 (85%)	162

Most studies that did include presentation variables made no attempt to distinguish between the two dimensions, except Froidevaux (2004), Marston and Polei (2004), Bollen *et al.* (2006) and Davey and Homkajohn (2004).

Marston and Polei (2004) reported results that suggest different determinants for respective content- and presentation-related variables. In a similar vein, Cormier *et al.* (2009: 19) reported that business-related disclosure had no impact on the earnings valuation multiple, except for the web-quality (i.e. presentation) component of business-related disclosures.

To summarise this section: It is important not only to include both content and presentation variables, but also to distinguish clearly between the two dimensions in the measurement instrument used.

3.2.2.2 Mandatory versus voluntary information

The majority of studies that examined corporate websites as disclosure vehicle measured both mandatory and voluntary attributes with no attempt to distinguish between the two information types. This is, however, not unexpected for the following reason. As discussed in Section 1.2.2 of

Chapter 1 and in Section 2.1 of Chapter 2, the use of the corporate website as communication channel is a voluntary activity. Notwithstanding that corporate websites may include both voluntary and mandatory information types (e.g. the annual report), it can be argued that in the absence of a regulatory framework to govern corporate websites, corporate website content is voluntary in nature.

De La Bruslerie and Gabteni (2011) measured voluntary disclosure by examining the annual report as disclosure medium. In their study, they proposed a methodology that could be used to distinguish between voluntary, quasi-mandatory and mandatory disclosure. In a literature review of previous voluntary disclosure studies, De La Bruslerie and Gabteni (2011: 14) stressed that what was considered voluntary in one country, may be mandatory in another country. It should also be noted that the classification of disclosure items as voluntary or mandatory will change over time, given the evolving nature of legislation.

Leuz and Verrechia (2000: 94) also examined annual report-based voluntary disclosures and argued that the relationship between mandatory disclosures (referred to as a 'commitment') and the cost of equity should be stronger than the relationship between voluntary disclosure and the cost of equity, as voluntary disclosures are reversible and *ex post* (Leuz & Verrechia, 2000: 94). Mandatory disclosure, on the other hand, is not reversible and is *ex ante*.

Ettredge *et al.* (2002: 368) examined the determinants of corporate website disclosure and found that fewer explanatory variables could be used to explain variations in the level of mandatory information types compared to voluntary information types.[72]

Although a distinction and separate analysis of mandatory and voluntary information items may aid in researching both the determinants and effect of IIR, the results of such studies should be interpreted with care, given the inherently voluntary nature of IIR, the evolving nature of legislation, as well as the differences between accounting regulatory systems of countries (e.g. as laid down by the IASB and FASB).

3.2.2.3 Financial versus non-financial information

Most studies measured both financial and non-financial variables, but made no attempt to distinguish between the two types of information, except for Hanafi, Kasim, Ibrahim and Hancock (2009), Celik *et al.* (2006), Aerts *et al.* (2007), Cormier *et al.* (2009), Khan (2006) and Khan (2007). According to Hanafi *et al*. (2009), the majority of all prior measurement indexes focused mainly on content, with no clear distinction being made between financial and non-financial information.

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[72] Ettredge *et al*. (2002*)* found that mandatory items are significantly associated only with size and a proxy for information asymmetry, while voluntary information items are associated with size, information asymmetry, demand for external capital, and companies' traditional disclosure reputations.

3.2.2.4 Objective versus subjective information

Ettredge, Richardson and Scholz (1999: 24) distinguish between information items with highly objective content as opposed to information items with highly subjective content.

3.2.3 Weighted versus unweighted disclosure scores

IIR studies can further be divided into studies that have assigned weights and studies that have not assigned weights. Studies that did assign weights can be categorised into studies that have assigned weights to individual attributes (discussed in Section 3.2.3.1 below) and studies that have assigned weights to categories (discussed in Section 3.2.3.2 below).

The majority of studies did not assign weights and had therefore simply calculated the disclosure score as the sum of the individual attributes with each attribute being assigned either one if available (i.e. present) and zero if not available (i.e. not present). In respect of the studies that did not assign weights, some gave motivations (e.g. Bónson & Escobar, 2002), others not. Arguments used in past studies to assign weights are discussed in Section 3.2.3.3 below, followed by a discussion of arguments that were used not to assign weights in Section 3.2.3.4.

See Table B1, Annexure B, for a summary of the use of weights by studies, as surveyed for this dissertation.

3.2.3.1 Attributes

Regarding studies that assigned weights to individual attributes, it is further possible to distinguish between the assignment of weights to reflect the degree of detail and/or to reflect the perceived importance thereof for users.

Aerts *et al.* (2007), Cormier *et al.* (2009) and Orens *et al.* (2010: 1066) assigned weights to reflect the degree of detail (three if the attribute was described in quantitative or monetary terms, two if discussed specifically, and one if the attribute was discussed only in general).

Larrán and Giner (2002: 75), on the other hand, assigned a weight of one for all content-related attributes and 0.25 to all attributes that were related to accessibility, navigation and the utilisation of the advantages provided by presentation technologies (e.g. alternative formats, such as excel financial statements and webcasts of presentations) to reflect the perceived importance of attributes for users.

In a similar vein, Chang *et al.* (2008) and Lai *et al.* (2010) both used a four-point weighted scale to reflect the importance of specific attributes for investors' decision making. Both studies have allocated scores between one and four for a 'yes' answer, i.e., say, three if the attribute was present, and no points if the attribute was absent.

Chang *et al.* (2008), for example, assigned a score of four for having a dedicated investor relations area and posting webcasts of analyst presentations; three for attributes such as analyst reports and conference call facilities; two for attributes such as the names of analysts covering the company and

PowerPoint presentations of the CEO. Most items were scored one. Lai *et al.* (2010), for example, assigned a score of four for the director's report; three for interim financial reports; two for condensed interim reports; and one for the dividend policy.

3.2.3.2 Categories

Pirchegger and Wagenhofer (1999) used four categories to categorise attributes: content, timeliness, technology and user support. They perceived content and timeliness to be more important than technology and user support, and therefore assigned weights to reflect this.

Lybaert (2002) used five categories: content (financial information), content (investor-related information), timeliness, technology, and user support. Following Pirchegger and Wagenhofer (1999), they perceived their first three categories as more important and therefore assigned weights to reflect this.

Marston and Polei (2004) and Spanos (2006) both assumed, based on Pirchegger and Wagenhofer (1999), that users regard the content of corporate websites as more important than presentation features and therefore assigned a weight of 60% to their content section and 40% to their presentation section.

Davey and Homkajohn (2004) assigned the following weights to their categories: content (40%), timeliness (20%), technology (20%) and user support (20%).

Bollen *et al*. (2006) categorised attributes in five categories and assigned the following weights to their categories: annual and interim reports (100%), press releases and further information (150%), presentation advantages of the internet (200%), contact details (150%) and video/audio and online participation (200%).

From Sections 3.2.3.1 and 3.2.3.2 it is therefore clear that studies differ not only in the attributes measured and categories used (as discussed in Section 3.2.2), but also in what manner weights were assigned to both individual attributes and categories.

3.2.3.3 Arguments used to assign weights

Celik *et al.* (2006) claim that weights should reflect the perceived usefulness attached to attributes by the users of the information. Aerts *et al.* (2007: 1309) asserted that the potential relevance and usefulness of monetary disclosure was generally perceived to be higher than that of descriptive disclosure and therefore necessitated a higher weighting.

Bollen *et al.* (2006) based their weights on the research results of Beattie and Pratt (2003). The Beattie and Pratt (2003) study investigated and compared the views of users, financial directors and auditors on corporate website reporting.

Hanafi *et al*. (2009) used the results of a survey questionnaire distributed to a sample of users (including bankers, auditors, finance executives, accountants, academics, regulatory agents and students) to assign weights to the various attributes in their measurement instrument.

Pirchegger and Wagenhofer (1999: 393) interviewed companies' investor relations representatives, financial analysts and students as rationale for the assignment of weights. In a similar vein, Spanos (2006) discussed their weightings with members of the Greek Union of Institutional Investors.

Although studies such as Pirchegger and Wagenhofer (1999), Bollen *et al.* (2006), Hanafi *et al.* (2009) and Spanos (2006) all have assigned weights based on some sort of survey, they all differ in respect of their choice of survey participants. Notwithstanding the contribution made by such studies in basing their weights on the researched usefulness attached to attributes, weights and results should be interpreted with care as corporate website users range from the naïve decision maker to the institutional investor and analyst, all with different requirements. As discussed in the next section, the argument that IIR will be used by various types of users is often used in literature as the reason not to assign weights.

3.2.3.4 Arguments used for not assigning weights

Although the majority of studies surveyed for this dissertation did not discuss either the advantages or disadvantages of using weights, a number of studies provided their underlying reasons for not using weights in their measurement. Celik, Ecer and Karabacak (2006: 105) cited the following research that showed similar results from using either a weighted or unweighted disclosure score: Robbins and Austin (1986) and Firth (1980). More specific to disclosure studies that had examined corporate websites as disclosure vehicle, Marston and Polei (2004), Bollen *et al.* (2006), Lai *et al.* (2010) and Xiao *et al.* (2004) all reported similar results for weighted and unweighted indices.

Beattie and Pratt (2003) reported results that show that users' views on the relevance and importance of the various disclosure practices differed considerably. Based on a survey by Beattie and Pratt (2003), there are six differences between the needs of private (i.e. retail) and expert (i.e. investment analysts and fund managers) users of information.

Expert users, for example, are more in favour of spreadsheets and XBRL. On the other hand, they are less in favour of making details of one-to-one meetings public, and HTML and PDF file formats. Private shareholders ranked HTML as the most preferred file format and PDF the least preferred. Interviews with fund managers and analysts revealed that the majority of these users prefer their documents in PDF format, with only the minority preferring HTML type documents (Jones, 2009: 1.2).

Bónson and Escobar (2006: 310), Trabelsi *et al.* (2008) and Hassan and Marston (2010: 33) therefore argued that, as the information would be used by various types of users and for different purposes, and as they were not interested in a particular group of users but all users, they had used an unweighted index. In a similar vein, Aly, Simon and Hussainey (2010) claim that the relative importance of items varied not only from user to user as suggested by Beattie and Pratt (2003), but also from company to company, industry to industry and would further change as technology evolved.

To summaries this section, reasons for not assigning weights include: To avoid the arbitrariness thereof (Bónson & Escobar, 2002: 35), information will be used by various types of users and for different purposes (Bónson & Escobar, 2006: 310), to avoid subjectivity (Froidevaux, 2004: 53; Pervan, 2006: 16) and previous research results that showed that weightings do not significantly alter the results (Celik *et al.,* 2006: 105; Aly *et al*., 2010: 188; Sánchez, Dominguez and Alvarez 2011: 484).

3.2.4 Quantity versus quality of information

As it is evident from Table B1, Annexure B, the majority of studies surveyed for this dissertation made no attempt either to distinguish between the quantity and quality of IIR or to measure the quality rather than quantity of information.

Financial reporting quality is an abstract concept that is hard to measure directly (Trabelsi *et al*., 2008). In their study, Hassan and Marston (2010: 32) found that there was no single measure of disclosure quality that had attracted no criticism to date. Core (2001: 452) emphasised two problems that could hinder metrics to measure the quality of disclosure: firstly, the labour-intensity thereof and, secondly, judgement error.

Louwers, Pasewark and Typpo (1998) reason that the ability of a website to anticipate all the information requirements of users in four areas, namely breadth, depth, frequency and timeliness, is a good indicator of the quality of Internet business reporting. Breadth refers to the comprehensiveness of the information, depth to the amount of historical information that is available, frequency to the number of times information is released, and timeliness to how up-to-date the information is.

As discussed in Sections 3.2.4.1 to 3.2.4.5, various approaches are suggested in the literature as proxy for disclosure quality.

3.2.4.1 Extent of content and use of weights

A number of studies reason that the extent of information disclosed is also an indicator of quality (Lang & Lundholm, 1993; Botosan, 1997; Leuz & Verrechia; 2000; Healy & Palepu, 2001; Bollen *et al*., 2006). Leuz and Verrecchia (2000), for example, argued that voluntary disclosure theories were broad enough to allow the interpretation of 'voluntary disclosure *level'* as 'voluntary disclosure *quantity'* and 'voluntary disclosure *quality'*.

Ashbaugh *et al.* (1999: 251) measured quality in terms of the nature of the disclosures (i.e. content) and the methods of dissemination (i.e. accessibility, navigation and timeliness). Marston and Polei (2004: 293) reasoned that the usefulness and therefore the quality of IIR was determined by the amount (i.e. content) and the presentation of the information. Davey and Homkajohn (2004) also argued that timeliness and the use of enhancement that could not be provided by hard copy annual

reports would improve the quality of IIR. Abdelsalam *et al.* (2007: 26) listed the following as drivers of quality investor communications: comprehensiveness, usability, and verifiability or credibility.

Chatterjee and Hawkes (2008: 33) used the accessibility and quantity of information as a proxy for the quality of corporate website disclosures. Debreceny *et al*. (2002: 376) asserted that the use of presentation technologies might improve the verifiability and the timeliness of information.

Cormier *et al*. (2009) measured eight attributes to proxy for web quality. These attributes were all related to timeliness (e.g. how up-to-date the website is), navigation (e.g. internal and external links) and the use of presentation technologies such as interactive components (e.g. ability to tailor or manipulate content), and web- or podcasts.

Trabelsi *et al.* (2008) argued that quality was measured by including the correct items in the measurement instrument and through the measurement itself (i.e. points should be attributed for the categories of information and the level of detail).

Aerts *et al.* (2007: 1309) used ratings of one to three to measure the usefulness of specific information. Monetary disclosure were, for example, perceived to be more useful than descriptive disclosure (Aerts *et al*., 2007). In a similar vein, Froidevaux (2004: 78), Bollen *et al*. (2006), Chang *et al.* (2008) and Orens *et al.* (2010: 1066) all suggested the use of weightings to capture the importance of each attribute as proxy for disclosure quality.

Although a number of studies have suggested the use of weightings (either of individual attributes or categories) as proxies for IIR quality, the vast majority of studies that intended to measure the quality of IIR have reasoned that both the extent of information disclosed, as well as the dissemination of information are indicators of quality. To enable the measurement of quality, this section therefore presents the argument that a measurement of IIR should, first of all, measure as widely as possible; and, secondly, should include presentation-related attributes.

3.2.4.2 Research results

Froidevaux (2004: 75) argued that although her research purpose was limited to the relationship between disclosure quantity and the cost of equity, the reported negative relationship between disclosure and the cost of equity showed that the disclosure attributes, as measured, were useful to investors.

3.2.4.3 Assessment of the actual content

Froidevaux (2004: 78) suggested an assessment of the actual content of the disclosed items as one alternative to measure the quality of information. Core (2001: 452) suggested the use of techniques in natural language processing (e.g. artificial intelligence) to lower the cost of calculating such disclosure metrics.

3.2.4.4 Indirect disclosure proxy

Some studies, such as Brown and Hillegeist (2007) and Ettredge *et al*. (2002), used analysts' evaluations of disclosure activities (i.e. AIMR) as proxy for disclosure quality.

3.2.4.5 Data reduction techniques

Hassan and Marston (2010: 35) reason that a drawback of disclosure indexes is that they do not explicitly consider the incremental information content (i.e. relative usefulness) of the different items of information included in the index. They suggested the use of data reduction techniques (e.g. factor analysis) by future researchers.

3.2.5 Sample selection criteria

Sample selection criteria used in the existing literature is briefly discussed in Section 4.2 and is summarised in Table 4.1. Further, Table B1, Annexure B, provides information of the countries where studies were done, as well as sample selection criteria.

3.2.6 Content analysis

Krippendorff (1980: 21) defined content analysis as a research technique for making replicable and valid inferences from data. It is a well-known and popular research method which has often been used to measure disclosure activities (e.g. by Geerings *et al.,* 2003; Hamid, 2005; Marston & Polei, 2004; Froidevaux, 2004; Bollen *et al*., 2006).

The following limitations of content analysis to measure corporate website disclosures are discussed in the literature:

- If conducted manually,[73] it is a labour-intensive process (Hassan & Marston, 2010: 17), which will restrict either or both the sample size and the number of attributes measured;
- The large and complex nature of corporate websites (e.g. hyperlinked sections) increase the risk of missing information (Froidevaux, 2004: 75); and
- The development of the disclosure index (i.e. measurement instrument to use) (e.g. attributes to include and whether to use a weighted or unweighted index) could be a subject to a selection bias (Froidevaux, 2004: 75).

Content analysis can be partial (i.e. it may cover only part of the document) or comprehensive (Hassan & Marston, 2010: 16). Froidevaux (2004: 28), Bollen *et al*. (2006), and Kelton and Yang (2008) analyse only the investor relations section of corporate websites, ignoring the remainder of the website. Brennan and Kelly (2000), Matherly and Burton (2005) and Froidevaux (2004) argued

[73] The alternative to the manually conducted content analysis is an automated approach using software packages such as Nudist or GI. See Hassan and Marston (2010: 17) for a discussion of the advantages and disadvantages of an automated approach.

that the purpose of their study was a content analysis of investor relations and not the annual report, and therefore they ignored any content disclosed in the annual report.

Lymer *et al.* (1999), FASB (2000), Aerts *et al.* (2007), Cormier *et al.* (2009), Orens *et al.* (2010) and Gajewski and Li (2015) measured only information presented in HTML format, ignoring the content of PDF documents.

Davey and Homkajohn (2004: 213), on the other hand, examined both PDF- and HTML-type documents. Financial information disclosed in HTML scored higher (2 points) than PDF (1 point). They argued that HTML is easier for users to access effectively. For the timeliness component of their measurement instrument, Davey and Homkajohn (2004: 225) looked only at HTML-type documents.

Orens *et al.* (2010) and Abdelsalam *et al.* (2007) limited their studies to information that was available on the homepage plus a maximum of five more drill downs from the homepage. They argued that important information should not be hidden, thus they ignored any information available only on further drilling down.

Lymer *et al.* (1999: 49) and Lybaert (2002: 210) ignored financial reporting pages on third-party sites unless there was a hyperlink from the corporate website to the third party site.

In the context of this study, a content analysis entails an examination of corporate websites using a measurement instrument. Literature differs not only in the composition of measurement instruments, as discussed in Sections 3.2.4 to 3.2.6, but also, as discussed in this section, in how comprehensively corporate websites were examined (e.g. looking at only PDF or both PDF and HTML documents, and evaluating all webpages or only specific web pages).

3.2.7 Disclosure score

Almost all direct disclosure measurement studies used a dichotomous scoring system, awarding a score of one for the presence and zero for the absence of a disclosure item or presentation technology (Cheng *et al.*, 2006; Froidevaux, 2004; Xiao *et al.*, 2004; Bollen *et al.*, 2006).

Some studies used the actual disclosure score, for example Froidevaux (2004), by simply adding the scores of the individual attributes compared to other studies that used rank scores, for example Botosan (1997), Hail (2002) and Cheng *et al.* (2006).

According to Froidevaux (2004), the actual disclosure score is a more sensitive measure of disclosure level than disclosure rank. Cheng *et al.* (2006: 39), whose sample spans seven industries, adjusted disclosure scores for industry effects by ranking each company's disclosure level within its own industry in the sample as follows: (rank in industry -1)/(number of companies in industry -1). Their adjusted disclosure index ranged from zero (lowest) to one (highest).

Hail (2002) used the fractional rank (rank divided by the number of companies) of the disclosure score, where a fractional rank of one indicates companies with the highest disclosure scores. Hail

(2002) argued that rank disclosure scores are less sensitive to the influence of outliers compared to absolute disclosure scores.

IIR studies can be categorised into studies that have used actual disclosure scores and studies that have used rank scores. Both methods have specific strengths and weaknesses. Rank scores, for example, may be less sensitive to outliers, but, on the other hand, are a less sensitive measure compared to the actual disclosure score.

3.2.8 Reliability and validity concerns

Hassan and Marston (2010) defined reliability as the ability of a measurement instrument to reproduce consistent results on repeated measurements, and validity as the extent to which the instrument measures what it is intended to measure.

Hassan and Marston (2010) discussed three reliability (test-retest; inter-coder and internal consistency) and three validity (criterion, content or face and construct) tests that are often used in the literature.

However, as it is evident from Table B1, Annexure B, the majority of those studies[74] either performed no reliability or validity tests or have performed tests, but failed to report or discuss the results thereof. This is consistent with results reported by Hasson and Marston (2010). Of the 50 studies reviewed by Hasson and Marston (2010) only 16 and 29 performed respectively a reliability and validity test.

Trabelsi *et al.* (2008) referred to the 'true value' model to evaluate the reliability and validity of their content analysis. According to the 'true value' model, the disclosure score consists of the theoretical value plus random error plus systematic error, where random error is linked to reliability and systematic error to validity.

3.2.8.1 Reliability tests

Test-retest measures the stability of the measurement instrument results over time. As the test-retest procedure requires repeated trials, resulting in time and money concerns, it is not considered feasible for a manual content analysis. Trabelsi *et al.* (2008) applied the test-retest method.

Inter-coder reliability measures the stability of results when the same analysis is conducted by more than one coder. Correlation coefficients and an analysis of discrepancies between coders can be used to assess inter-coder reliability.

Internal consistency assesses how well the different items in a measurement instrument measure the same subject matter. Cronbach's alpha, a measure of inter-item correlation can be used to assess the internal consistency. Hassan and Marston (2010: 27) suggested a minimum alpha of 0.8

[74] Only determinant and effect direct disclosure proxy studies that have measured corporate websites as disclosure vehicle are included in Table B1. Determinant studies examine the determinants or explanatory variables of disclosure, and effect studies the association between disclosure and variables, such as information asymmetry and the cost of capital.

to indicate internal consistency. Serrano-Cinca *et al.* (2007), on the other hand, used 0.7 as the recommended value. Nunnaly (1978: 245) also suggested 0.7 as an acceptable level.

The following studies listed in Table B1, Annexure B, have calculated Cronbach's alpha (the alpha measurement is given in brackets): Aerts *et al.* (2007) (0.74), Kelton and Yang (2008) (0.6, 0.73, 0.77 and 0.82), Trabelsi *et al.* (2008) (0.872), Cormier *et al.* (2009) (0.703), Orens *et al.* (2010) (0.74), Serrano-Cinca *et al.* (2007) (0.78), and Eugster (2014) (0.75).

Botosan (1997), Froidevaux (2004: 53), Cheng *et al.* (2006: 40) and Kelton and Yang (2008: 72) measured the internal consistency of the disclosure score by calculating correlation coefficients between disclosure categories.[75] Positive and significant correlations between categories were assessed as an indication of internal consistency.

3.2.8.2 Validity tests

Criterion validity is a measure of how well one measurement instrument compares (i.e. correlates) with another instrument (the criterion variable). The correlation between the measurement instrument and the criterion variable is used to assess the validity. AIMR scores (Botosan, 1997; Ashbaugh *et al.*, 1999), and external awards (e.g. annual report rewards in Eng & Mak, 2003) could be used as criterion variables.

Content or face validity involves an assessment through third-party judgement. Hanafi *et al.* (2009), Hail (2002), Cheng *et al.* (2006) and Kelton and Yang (2008) applied content validity. According to Hassan and Marston (2010), different perceptions among users hindered the use of content validity to come to a conclusion on the validity of an instrument.

Construct validity measures the extent to which a measure performs in accordance with theoretical expectations. Hail (2002), Trabelsi *et al.* (2008), Chang *et al. (*2008: 388), Froidevaux (2004: 54) and Orens *et al.* (2010: 1069) applied construct validity to validate the use of their measurement instruments.

3.3 METHODOLOGY FOLLOWED IN THE DEVELOPMENT OF THE INSTRUMENT

The first objective set for this study was to suggest a measurement instrument that could be used to measure the quality of IIR in a South African context. Based on the literature review in Section 3.2 above, a six-step methodology process was followed to accomplish this first objective.

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[75] Botosan (1997), Froidevaux (2004: 53), Cheng *et al.* (2006: 40) and Kelton and Yang (2008: 72) discussed the internal consistency of the disclosure score as part of the study section that discussed validity. Kelton and Yang (2008) and Botosan (1997) calculated both Cronbach alpha and correlation coefficients between disclosure categories to assess the internal consistency of their measurement instrument.

This process entailed the following six questions:

- Which content and presentation attributes should be measured and how should these attributes be categorised?
- Should weights be assigned to either the individual attributes or the categories into which the attributes are organised; or should no weights be assigned?
- How will the quality of IIR be measured, instead of mere quantity?
- Will the measurement be limited to any specific sections of the corporate website, and will specific documents or document types be excluded from measurement?
- How will the measurement instrument be applied and how will the disclosure scores be calculated?
- How will reliability and validity concerns be addressed?

3.3.1 Attributes measured

Although no standards currently exist to regulate IIR, best practice corporate website guidelines are published annually by the Investor Relations Society (IRS). These guidelines offer advice on creating a best practice corporate website that will help companies communicate more effectively with investors and other stakeholders (IRS, 2013a). Following Hanafi *et al.* (2009), Brennan and Hourigan (1999) and Laskin (2007), this study has also used the IRS guidelines as starting point.

Although similar guidelines were published by the Nielsen Norman Group, these guidelines were not as freely available as the IRS guidelines (the Nielsen Norman guidelines are available for download at $248). Abdelsalam *et al.* (2007) used the Nielson Norman guidelines to develop their measurement instrument. Abdelsalam *et al.* (2007) did not publish the measurement instrument they have used in their study.

Based on the IRS guidelines, core attributes were identified. The categories used by the IRS best practice guidelines were used as benchmark to organise attributes in categories throughout the development of the measurement instrument. Table 3.6 summarises these categories.

According to Froidevaux (2004: 53) and Loehnis (2007: 1) content should be measured as widely as possible to mitigate the risk of omitting important variables. Therefore, an extensive literature review (see Tables B1 and B2, Annexure B, for a brief summary and description of these studies) was done to identify attributes measured in existing instruments that are not included in the IRS best practice guidelines. This was done for three reasons:

- To measure as widely as possible to mitigate the risk of important attributes being omitted;
- To improve the comparability of this study to previous studies; and
- For guidance on how to measure specific attributes.

Most studies that have used a measurement instrument refer to one or more prior studies as rationale for the development of measurement instruments. Loxton (2003), Geerings *et al.* (2003), Hamid

(2005) and Esterhuyse and Wingard (2016) all used an instrument based on the work of Deller *et al.* (1999) and Hedlin (1999). Lybaert (2002) and Marston (2004) used an instrument based on the work of Pirchegger (1999). Aerts *et al.* (2007), Cormier *et al.* (2009) and Orens *et al.* (2010) applied an instrument based on balance scorecard literature. Various studies were based on studies conducted by the Financial Accounting Standard Board (FASB) (FASB, 2000) and the International Accounting Standards Committee (IASC)[76] (Lymer *et al.* 1999).[77]

More recently, Gajewski and Li (2015: 123)[78] developed a measurement instrument to measure Internet-based disclosure based on research by Deller *et al.* (1999), Pirchegger and Wagenhofer (1999), Debreceny *et al.* (2001), Ettredge *et al.* (2002) and Marston and Polei (2004). The development of an instrument based on prior research is therefore often used. This study, however, identified four shortcomings of such an approach:

- Some of these studies were performed as early as 1999 which may place the relevancy of some attributes in question.
- As is evident from Tables 3.2 and 3.3, not all of these studies intended to measure investor relations per se.
- The inclusion of attributes not listed or discussed in best practice guidelines could be questioned.
- According to the FASB (2001: 14), it is not possible to determine a definitive list of all important aspects, as not all companies are alike and attributes that are important for one company may not be applicable to another company.

These shortcomings were considered throughout the development of the measurement instrument and were also considered in the pilot study. The next step was a pilot study[79] of JSE-listed companies. For the pilot study, eight companies[80] were randomly selected from a list of JSE-listed companies.

The objectives of the pilot study were as follows:

- To evaluate the practicality of measuring the attributes as identified from the IRS best practice guidelines and the literature review.
- To identify omitted attributes that may be applicable only in the South African environment

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[76] The IASC was the predecessor of the current International Accounting Standards Board (IASB).
[77] Debreceny *et al.* (2002), Larrán and Giner (2002), Trabelsi *et al.* (2004), Khadaroo (2005), Celik *et al.* (2006) and Kelton and Yang (2008)), for example, used the FASB study; and Allam and Lymer (2003), Larrán and Giner (2002) and Lodhia, Allam and Lymer (2004) the IASC study.
[78] This study was published too late to be included in the literature review process that was followed to develop the measurement instrument used in this study and is therefore also not included in Table B1, Annexure B. The inclusion of this study in the earlier literature review would not have made a difference in the attributes that were included in the instrument as used in this study. Using the measurement instrument developed in this study, company websites were measured over a six-month period between March and September 2015.
[79] Bollen *et al.* (2006) conduct a pilot study for five to ten companies in each country included in their study.
[80] The following companies were included in the pilot study sample: Richemont, Imperial, Net1 UEPS Tech, Merafe Resources, Ascension Properties, Mustek, Morvest and African Eagle.

- To obtain further guidance on how to measure specific attributes.
- To do preliminary reliability and validity tests

From the IRS best practice guidelines, 105 attributes (35 presentation and 70 content) were identified. Following the literature review and pilot study, additional attributes were added and some attributes were further sub-divided into additional attributes to improve the measurement thereof and to ensure the continuous use of a binary scale. Table 3.5 provides an example of how one best practice guideline was sub-divided into separately measurable attributes using a binary scale.

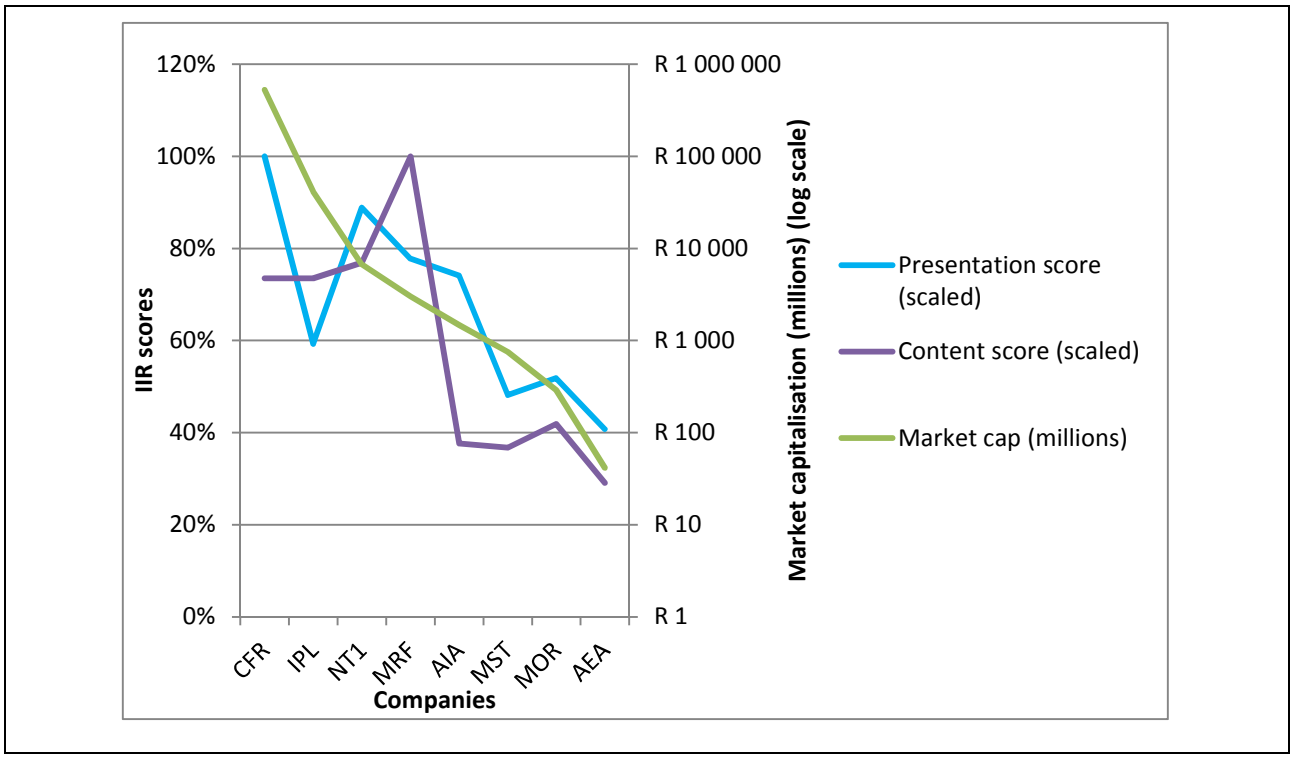
Table 3.5: An example to illustrate how some best practice guidelines was sub-divided

Best practice guideline	IRS best practice attribute	Attributes measured in this study
Provide biographical detail of all directors giving their age, date of appointment and other directorships/appointments. Additional information such as areas of expertise can also be included.	Directors – biographical detail	(1) List of directors, (2) Photos, (3) Age, (4) Qualifications, (5) Date of appointment, and (6) Other directorships

Reliability and validity tests were discussed in Section 3.2.8 above. One of the objectives of the pilot study was to do a preliminary assessment of the reliability and validity of the measurement instrument. The correlation between disclosure categories (i.e. content and presentation) was used as a preliminary reliability test (i.e. internal consistency) and the correlation between the instrument score and market capitalisation as a preliminary validity test (i.e. construct validity).

The Pearson correlation coefficient between the content and presentation category of 0.67 did provide preliminary evidence of internal consistency. Previous research (as discussed in Chapter 4) used the expected positive association between market capitalisation and disclosure as indicator for construct validity. The Pearson correlation coefficient of 0.34 between market capitalisation and the total disclosure score was therefore used as indicative of construct validity.

Figure 3.1 depicts the relationship between the presentation category score, the content category score and market capitalisation. The presentation and content category score of each company was scaled as a percentage of the maximum score that was achieved by a company in the pilot study for the presentation and content category respectively.



Note: CFR (Richemont), IPL (Imperial Holdings), NT1 (Net 1 UEPS Tech), MRF (Merafe Resources), AIA (Ascension Properties), MST (Mustek), MOR (Morvest) and AEA (African Eagle).

Figure 3.1: Pilot study results

From Figure 3.1 the positive correlations above between the content and presentation category, as well as between the disclosure categories (i.e. content and presentation) and market capitalisation, are evident. As discussed in Chapter 4, the reliability and validity of the measurement instrument were however only confirmed after the measurement of the sample companies was completed.

Disclosure indices are often criticised for selection bias. Following Froidevaux (2004: 75), this study attempted to mitigate this problem by using a disclosure instrument which is as inclusive as possible. The result was the selection of a measurement instrument that consisted of 346 attributes, organised into 11 categories. The 11 categories that were used in this dissertation to organise the 346 attributes are summarised in Table 3.6. These 11 categories are discussed in more detail in Section 4.3 and Annexure C (measurement conventions). Table 3.6 also lists the number of attributes that were measured per category. The complete list of attributes, organised per category, is available in Table D1, Annexure D.

Table 3.6: Categories used and number of attributes measured in this dissertation

Category	Attributes in category
Accessibility	13
Navigation	14
Timeliness	12
Company information	36
Financial information	65
Relevant news	23
Investment case	26
Shareholder information	60
Bondholder information	5
Corporate governance	50
Corporate responsibility	42

3.3.2 The use of weights

As discussed in Section 3.2.3 above, weights can either be assigned to individual attributes or categories. The theoretical arguments in support of and against the use of weights were discussed in Section 3.2.3, as were related empirical results.

In conclusion, given the subjectivity involved in the assignment of weights, the fact that corporate websites are used by various types of stakeholders and investors with different needs in terms of both content and presentation, and previous research that documents similar results for studies using weighted and unweighted instruments, this study opted not to apply weights to either individual attributes or to categories.

3.3.3 Quality of Internet investor relations versus quantity

In Section 1.3.2, IIR, for the purpose of this study, is defined as to refer to the quality of IIR. It is, however, important to distinguish between the quality of information and the quality of the communication process. The quality of information can be measured in terms of completeness, timeliness and accuracy. For example, the questions can be asked: Are all news items published or only good news? Are all analyst reports published or only reports with a strong buy-opinion? Is the published strategy indeed the latest strategy? Is the list of directors complete?

Leuz and Verrechia (2000: 99) listed three major problems in testing the relationship between disclosure and information asymmetry: information asymmetry cannot be observed directly, self-selection bias and disclosure have both 'news' and 'information asymmetry' effects. Although the 'news' effect is extremely important, this study, following Bollen *et al.* (2006: 297) did not measure

the actual or perceived quality of disclosure content or distinguished between 'good' news and 'bad news' as disclosed by companies on their corporate websites.[81]

As discussed in Section 3.2.4, a number of authors have argued that the quality of disclosure (and of IIR) depends on two broad factors: the extent of the attributes measured (i.e. content) and the presentation thereof. Presentation refers to the accessibility, timeliness, ease of finding the information (i.e. navigation) and in general the use of presentation technologies to communicate in ways not available via conventional communication channels. `

As discussed in Section 3.2.4 above, breadth (i.e. comprehensiveness) and depth (amount of historical information) (Louwers *et al.* 1998) are two indicators of the quality of IIR. According to Trabelsi *et al.* (2008), a dichotomous scoring approach is only suitable for evaluating the existence of a piece of information and not its extent or quality. Aerts *et al.* (2007), Cormier *et al*. (2009) and Orens *et al.* (2010: 1066) assigned weights to reflect the degree of detail (three if the attribute was described in quantitative or monetary terms, two if discussed specifically, and one if the attribute was only discussed in general).

Instead of assigning ratings to attributes, this study further sub-divided attributes to ensure the consistent use of measurement scores per attribute between zero and one (see example in Table 3.5 above) and, for 50 of the 346 attributes, availability was measured as either absent (0) or partially available (0.5) or available (1) to ensure that the measurement instrument distinguished between attributes based on their breadth and depth.

As discussed in Chapter 1, Sections 1.2.4 (advantages) and 1.2.5 (disadvantages), the way in which information is presented or not presented is important in realising the benefits available from a well-developed IIR strategy. Louwers *et al.* (1998) also included timeliness and frequency (number of updates released) as two indicators of IIR quality.

Non-functional[82] and unuseful[83] links were assessed as absent (0). Outdated information was assessed as either partially available (0.5) or absent (0).[84] Where information was available, but as a result of factors such as poor layout, inconsistencies and incompleteness was not fully useful, the attributes were assessed as partially available (0.5).

As with Allam and Lymer (2003), the assignment of either a 1 or 0.5 or 0 per attribute did not depend on the importance of the attribute or the quality of the underlying information (except timeliness and links not working), but was merely a measure of availability.

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[81] This was also discussed in Chapter 9 as a possible limitation of the study.
[82] For example: "this page can't be displayed."
[83] For example: "click here for share price history" links to www.jse.co.za homepage.
[84] As a general rule, information older than five years was assessed as absent, if updated information was a reasonable expectation, e.g. shareholders' information. In a similar vein, information older than a year was assessed as partially available, unless updated information was not a reasonable expectation or unless it was classified and separately measured as archived information (e.g. archived reports and presentations).

In conclusion, this research attempted to measure quality by measuring content as widely as possible and by measuring the presentation of information (e.g. accessibility, timeliness and navigation). Although the majority of attributes were measured as either available (1) or absent (0), 50 attributes were measured as partially available (0.5), based on the breadth and depth of content available. Based on timeliness and usability, some attributes were measured as only partially available (0.5). Although there was some subjectivity involved in such a methodology, this dissertation argued that such an approach was important to ensure that the quality of IIR would be measured and not merely the quantity. Measurement conventions followed are specifically discussed in Annexure C and Chapter 4.

3.3.4 Corporate website sections and document types measured

According to Lybaert (2002: 195), companies design corporate websites for various reasons, for example, to advertise company products, facilitate electronic commerce, promote brand identification, attract potential employees, and enhance the corporate image. In view of the fact that websites may be extensive, with information spread over numerous pages, it is important that conventions followed in the content analysis are discussed. It is further important to distinguish between the ability of investors to find information as opposed to the information being available somewhere on the website.

More specifically, the purpose of this section was to consider the following:

- Should the entire corporate website or only the investor relations section be surveyed?
- How many clicks or drill downs from the homepage will be surveyed?
- Should only PDF or only HTML file formats be surveyed, or both?
- Will research assistants be used?

3.3.4.1 Corporate website sections analysed: Investor relations versus entire website

Research by Nel and Baard (2006) found that the 40 largest JSE-listed companies (in terms of market capitalisation) all had working corporate websites and dedicated investor relations sections in 2006. In accordance with the findings of Nel and Baard (2006), the majority of companies in the pilot study had a dedicated investor relations section.

From the pilot study it was, however, evident that companies also had dedicated sections on their corporate websites for financial, corporate governance and sustainability (corporate responsibility) information in addition to having a dedicated investor relations section. Some companies also published corporate governance and sustainability information under a dedicated ‘about’ or ‘about us’ section.

Although various studies (e.g. Froidevaux, 2004; Bollen *et al*., 2006; Kelton & Yang, 2008) had examined only the investor relations section, this dissertation argues that given the scope of the

measurement instrument and the findings from the pilot study, the study objectives would best be achieved by an examination of the entire website.

Following Lymer *et al.* (1999: 49) and Lybaert (2002: 210), hyperlinks to third party corporate websites were ignored, unless there was a clear link to the website with a specific and clear indication of the type of information (e.g. share price information) that would be accessed.

3.3.4.2 Corporate website sections analysed: drill downs from homepage

It was evident that almost all companies surveyed in the pilot study had a relatively flat website structure (i.e. more categories on the homepage, but fewer vertical levels), as opposed to a deep structure that would be characterised by fewer categories, but more vertical levels.

It was therefore decided not to limit the number of clicks investigated, but to investigate all internal hyperlinks available on the corporate website. This research decision ran contrary to those adopted in other studies, such as Orens *et al*. (2010) and Abdelsalam *et al.* (2007) which examined only the homepage plus a maximum of five drill downs.

3.3.4.3 Corporate website documents analysed: PDF versus HTML file formats

Following Lymer *et al.* (1999), FASB (2000), Aerts *et al.* (2007), Cormier *et al*. (2009), Orens *et al.* (2010), and Gajewski and Li (2015), this study measured only information presented in HTML format, thus ignoring the content of all PDF documents. Although the Esterhuyse and Wingard (2016) study was not considered in the development of the measurement instrument used in this dissertation, these authors followed a similar approach and specifically stated that “this study does not involve an assessment of the completeness of integrating reporting, but rather the use of the internet as an IR communication channel”. The Esterhuyse and Wingard (2016) study is discussed in Section 3.4.

Besides using dedicated HTML sections for annual reporting, some companies in the pilot study increased the accessibility to annual reports through the use of hyperlinks to the inside of PDF annual reports (e.g. ‘for more information about the directors, click here’) or through separate PDF downloads for specific information (e.g. separate PDF downloads for directors’ biographies). In these instances the PDF documents were analysed.

Although it was clear that many of the attributes measured in this study would be available within PDF annual reports, this dissertation argues that, given the importance of using presentation technologies to improve the accessibility of information, companies that only published PDF annual reports did not fully utilise the advantages offered by using corporate websites as communication medium. With reference to Section 1.2.2 in Chapter 1, such companies could therefore be classified as Stage 1 companies (Lymer *et al.,* 1999), as paper lovers (Serrano-Cinca *et al.,* 2007) or as quadrant III or IV companies according to Figure 1.1 (FASB, 2000).

In similar vein, Pirchegger and Wagenhofer (1999: 391) argued that although most of the information they measured on corporate websites was also available from other sources, it was often less convenient, more costly or more time-consuming for investors to access these sources.

3.3.4.4 Use of research assistants

To conduct the pilot study, it was necessary to spend an average of eight hours per company. Although a considerable learning curve could reasonably be expected as a reward, measuring 85 companies with an instrument that included 346 attributes was, without doubt, an extremely laborious task.

One possible way of easing the load would have been the use of research assistants or a research team. Although the use of more than one researcher in studies of this magnitude is common (e.g. Ettredge *et al.,* 1999; Eng & Mak, 2003; Khadaroo, 2005a; Aerts *et al.,* 2007; Chang *et al*., 2008), following an initial attempt to appoint research assistants, it was decided that all companies included in the sample would be surveyed by only one researcher (the writer of this dissertation).

An important advantage of using only one researcher was that it would provide a more consistent view of each company (Lybaert, 2002). On the downside, the data collection process in this study took six months, which – although longer than for most comparable studies – was nevertheless acceptable given, for example, that Bollen collected data over an eleven-month period (Bollen *et al.,* 2006).

3.3.5. Calculation of the disclosure score

As discussed in Sections 3.3.2 and 3.3.3 above, all attributes were measured as either absent (0), partially available (0.5), or available (1). As it is evident from Table 4.4 (Chapter 4 – Results), the majority of attributes were assessed as either absent (0) or available (1).

To calculate the actual disclosure score per company, the scores of individual attributes were simply added together. As discussed in Section 3.2.7, some studies used ranked disclosure scores. Following Froidevaux (2004), this study used actual disclosure scores.

3.3.6 Reliability and validity

Reliability and validity tests were discussed in Section 3.2.8 above. The first two reliability tests discussed in Section 3.2.8, namely test-retest and inter-coder reliability, were not applicable to this study. Given the objectives of the study as discussed in Chapter 1, this study only measured IIR per company on one occasion and any re-measurement (i.e. test-retest reliability test) would therefore not be applicable. Also, as discussed in Section 3.3.4.4 above, all measurements were done by only one researcher and, consequently, it was not necessary to perform any inter-coder reliability tests.

To ensure reliability, internal consistency (as discussed in Section 3.2.8.1) was tested in two ways: by applying Cronbach's alpha and, in accordance with Froidevaux (2004), Cheng *et al.* (2006) and Kelton and Yang (2008), by examining the correlation coefficients between disclosure categories.

Following Hail (2002), Trabelsi *et al.* (2008), Chang *et al.* (2008), Froidevaux (2004) and Orens *et al.* (2010), construct validity was applied to validate the use of the measurement instrument. If the measurement instrument was to be deemed valid, it should produce correlations similar to company characteristics found in previous research studies.

In addition to construct validity, criterion and content validity, as discussed in Section 3.2.8.2, could be used as validity tests. Failing to find a suitable criterion variable for the study sample, this dissertation disregarded criterion validity as a validity test.[85] Content or face validity was not applied for three reasons:

- Given the number of attributes, it was considered impractical owing to the amount of time that would be expected from users to express judgment.
- The instrument was already based on best practices as issued by the Investor Relations Society (IRS).
- The diversity of the users of corporate websites (from the naïve decision maker to the institutional investor and analyst) makes it difficult to select the experts needed to express judgment.

Reliability and validity tests, as discussed above, were only done after all measurements for the sampled companies were completed (except for the preliminary assessments done for the pilot study results, as discussed above). Reliability and validity are therefore discussed further in Chapter 4.

3.4 ESTERHUYSE AND WINGARD (2016) STUDY

Esterhuyse and Wingard (2016) (referred to as E&W in the remainder of this section) published a study titled *An exploration of the online investor relations (IR) practices of companies listed on the Johannesburg Stock Exchange (JSE)*. This E&W study used an extensive measurement instrument consisting of 201 items to assess the websites of 205 JSE-listed companies during the course of 2012.

Given the apparent similarity between E&W and the research objectives of this dissertation, a separate discussion of the E&W study is justified. As discussed in Section 2.1, the literature can be categorised as consisting of descriptive, determinant or effect studies. Seven research objectives were set for this dissertation in Section 1.4.1. The first two of these seven objectives (to develop a measurement instrument and to measure corporate websites) can be associated with descriptive studies; the third objective with determinant studies, and the fourth to seventh objectives with effect studies.

Although the E&W study did discuss information asymmetry in its literature review and the authors mentioned that determinants of IIR would be investigated in the next phase of their study, the work

[85] As discussed in Section 3.2.8.2, previous studies used AIMR scores, CIFAR scores and investor relations or annual report awards as criterion variables, none of which were available for the sample studied.

can best be classified as a descriptive study. The E&W study is therefore discussed with reference to the first two objectives that were set for this dissertation. Relating to the first dissertation objective, the methodology followed in the E&W study to develop their measurement instrument is discussed in the next section. The sample selection methodology followed in the E&W study, as well as their results, are discussed in Section 4.7.

3.4.1 Esterhuyse and Wingard (2016): development of a measurement instrument

E&W developed their measurement instrument using the guidelines[86] published by the Nielsen Norman Group and the Investor Relations Society (IRS). As discussed in Section 3.3.1, this study did consider the guidelines published by the Nielsen Norman Group, but as they were not as freely available as the IRS guidelines, the Nielsen Norman guidelines were not used in this study. Similarly to Abdelsalam *et al.* (2007), who also used the Nielsen Norman guidelines, E&W did not publish their measurement instrument in their research article.

To enable some comparison between the E&W study and this dissertation, Table 3.7 re-categorises the E&W categories into the categories that were used in this dissertation. Table 3.7 shows that E&W attributes best relate to the following five categories that were used in this dissertation: navigation, accessibility, company information, financial information and shareholder information. Although some corporate responsibility, corporate governance and investment case-related attributes were probably included in the E&W study under “financial and other reports”, it seems that the following categories of attributes were not measured in the E&W study: timeliness, relevant news, investment case, bondholder information, corporate governance and corporate responsibility. These six categories in total comprised 158[87] of the 346 attributes that were measured in this study. Table 3.6 in Section 3.3.1 lists the categories that were used in this dissertation.

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[86] *Designing Websites to Maximize Investor Relations Usability – Guidelines for Investor Relations (IR) on Corporate Websites.*

[87] Timeliness (12), relevant news (23); investment case (26); bondholder information (5); corporate governance (50); corporate responsibility (42).

Table 3.7: Categories measured: Esterhuyse and Wingard versus this dissertation

E & W - Category	E & W -Number of attributes	Equivalent category used in this study
Getting to corporate information	6	Navigation / Accessibility
General usability	18	Navigation / Accessibility
Company information	32	Company information
Financial and other reports	26	Financial information
HTML and PDF reports	14	Financial information
Presentations	34	Financial information / Shareholder information
Share details	28	Shareholder information
Share charts	19	Shareholder information
Calendar	6	Shareholder information
Contacting investor relations	16	Shareholder information
International aspects	2	Shareholder information

Even though a more detailed comparison of the two measurements was not possible as the E&W study did not publish its measurement instrument, it is clear that the E&W study focused on usability, financial information and shareholder information. The usability focus was probably the result of the use of the Nielsen Norman usability guidelines. Granting that usability is extremely important (just as the accessibility of information is equally important to the availability of information, as discussed in Chapter 1), this dissertation argues that a valid measurement of investor relations should include attributes such as relevant news, investment case, bondholder information, corporate governance and corporate responsibility.

The E&W study assessed all attributes as either available or absent and assigned a score of one or zero, respectively. As discussed in Section 3.3.3, this study measured some attributes as only partially available, resulting in a score of only half a mark. The rationale of assessing attributes as only partially available was to distinguish between mere quantity as opposed to quality.

As discussed in Section 3.3.2, this study decided against the use of weights, given the subjectivity involved in assigning weights and other research which had documented similar results between weighted and un-weighted scores. The E&W study did refer to the assignment of weights in order to emphasise the importance of presentation attributes.

The E&W study used four postgraduate students to assess the corporate websites. The use of research assistants was discussed in Section 3.3.4.4 of this study. As explained in Section 3.3.6, this study did not perform any inter-coder reliability tests as all measurements were done by only one researcher. The E&W study either performed no reliability and validity tests or failed to report on them.

3.5 SUMMARY AND CONCLUSION

The existing literature on this subject were categorised into studies that used an indirect disclosure proxy (e.g. analyst ratings) and studies that used a self-constructed measurement instrument to measure disclosure levels. As no suitable indirect disclosure proxy or existing measurement instrument was available at the outset of this study, it was decided that the study objectives could best be reached through the development of a measurement instrument that was based on the best practice guidelines as issued by the Investor Relations Society (IRS).

Attributes identified from these best practice guidelines were further improved with a literature review and pilot study. Given the subjectivity involved with the assignment of weights; the fact that corporate websites are used by various types of stakeholders and investors with different needs, and previous research that had documented similar results for studies using both weighted and unweighted instruments, this study opted not to assign weights to either individual attributes or categories.

The majority of corporate website disclosure studies to date measured only the quantity of information and made no attempt to distinguish between quantity and quality. Although this study made no attempt to measure the quality of the underlying information (e.g. annual report quality), the dissertation promotes the argument that the quality of the communication process, and therefore IIR, would be captured with the following three characteristics of the measurement process:

- By measuring content as widely as possible;
- By specifically measuring the presentation of information (i.e. accessibility, timeliness and navigation); and
- By measuring some attributes as partially available (0.5), as discussed (e.g. usability and timeliness issues).

In accordance with previous studies and given the importance to distinguish between the availability as opposed to the accessibility of information, the content of PDF documents (e.g. annual reports) were not examined, unless a dedicated and descriptive hyperlink was provided to guide users to the information.

Notwithstanding the fact that no research assistants were used and that the measurement instrument was based on best practice guidelines and a literature review, the internal consistency was assessed with Cronbach's alpha and correlation coefficients between disclosure categories to assess the reliability of the instrument and construct validity as validity test (as further discussed in Chapter 4).

CHAPTER 4
EMPIRICAL RESULTS OF THE CONTENT ANALYSIS

4.1 INTRODUCTION

The first research question for this study was: To what extent do JSE-listed companies use corporate websites to communicate with investors? Two research objectives were set in Chapter 1 to answer this research question, namely to develop a measurement instrument and to measure the extent of IIR scores. As discussed in Section 1.3.2, for the purpose of this study, Internet investor relations (IIR) is defined to refer to the quality of IIR. The measurement instrument was developed and described in Chapter 3. The purpose of this chapter is to discuss the results of the measurements.

The first section of this chapter (4.2) discusses the sample selection procedure that was followed to select the study sample of 85 companies. These companies, as listed in Table A1 of Annexure A, were measured during a six-month period from March to September 2015. To ensure a random sample which could be used to make valid inferences about the population, the pilot study companies were not included in either the results presented in this chapter or in any further statistical tests in this dissertation. It should be noted that the pilot study was performed during May 2014 and that the results may therefore not be comparable with the sample results.

Although the majority of attributes were measured as either available (1) or absent (0), 50 attributes were measured as either available (1), partially available (0.5) or absent (0) to improve the measurement of the breadth and depth of content. Further, as discussed in Section 3.3.3 in Chapter 3 and Section 1.2.2 in Annexure C, outdated and not fully usable attributes were also measured as only partially available (0.5).

Table 3.6 in Section 3.3.1 lists the 11 categories that were used in this dissertation to categorise the attributes that were measured. Section 4.3 discuss these 11 categories and the attributes measured in each category, as well as the results of the measurements that were done by means of a vertical analysis (i.e. per attribute). The complete list of attributes, organised per category, is available in Table D1, Annexure D. The unregulated nature of IIR resulted in a number of challenges in the measurement process. These challenges are briefly discussed in Section 4.4. Section 4.5 discusses the results of the reliability and validity tests that were done, as discussed in Section 3.3.6. Further to the vertical analysis as discussed in Section 4.3, a horizontal analysis (i.e. per company) was done. The results of this horizontal analysis is discussed in Section 4.6. The measurement process and research results of the Esterhuyse and Wingard (2016) study is discussed in Section 4.7.[88] This chapter concludes with a summary, conclusion and recommendations in Section 4.8.

[88] As discussed in Section 3.4, the Esterhuyse and Wingard (2016) study is separately discussed in this dissertation given the apparent similarity between this study and the first two research objectives of this dissertation. The methodology that

4.2 SAMPLE SELECTION

As discussed in Chapter 1, the sampling technique that was used was stratified random sampling with proportional allocation. This section first discusses and motivates the population definition used in this study, followed by a detailed description of how the sample was selected.

4.2.1 Defining the population

Many studies have included only the largest listed companies in their sample, or included only specific industries,[89] or excluded specific industries[90]. Table 4.1 provides a summary of the sample selection criteria that were used in previous studies that have examined the association between disclosure and either information asymmetry or the cost of capital using a direct measurement of disclosure as disclosure proxy.

Table 4.1: Sample selection criteria used in the disclosure literature

Sample selection criteria	Study (country) (number of companies) (number of attributes measured)
Study limited to one industry only	Botosan (1997) (US) (122 companies) (63 attributes) – only manufacturing industry
Only largest companies - market capitalisation (excluding financial industry)	Orens *et al.* (2010) (US; Canada; Belgium; France; Germany; Netherlands) (895 companies) (88 attributes) Cormier *et al.* (2009) (Canada) (189 companies) (111 attributes)
Specific index	De La Bruslerie and Gabteni (2011) (France) (67 companies) (40 attributes) – SBF120[91] Chang *et al.* (2008) (290 companies) (44 attributes) - S&P/ASX 300[92]
All listed companies	Cheng *et al.* (2006) (Singapore) (104 companies) (72 attributes) - SGX[93] Lai *et al.* (2010) (Taiwan) (101 companies) (28 attributes) - TSE[94]
Combination of largest and smallest companies; specific industries only	Froidevaux (2004) (US) (141 companies) (102 attributes)
Random sample	Trabelsi *et al.* (2008) (Canada) (108 companies) (79 attributes)
Data availability	Francis *et al.* (2008) (US) (677 companies) (25 attributes)

was followed in the Esterhuyse and Wingard (2016) study in the development of their measurement instrument was already discussed in Section 3.4.1.

[89] Matherly and Burton (2005) specifically compared high risk and low risk industries and therefore selected computer hardware and pharmaceuticals as industries that were high-tech and therefore more risky, and auto and auto parts and food and beverages as industries that were more mature and less risky.

[90] Trabelsi *et al.* (2008) excluded financial sector companies from their sample based on the argument that their particular characteristics could bring distortions in the data. In a similar way, Cormier *et al.* (2009: 6), Aerts *et al.* (2007: 1307) and Orens *et al.* (2010) excluded all financial companies.

[91] Société des Bourses Francaises (SBF)

[92] Standard & Poor's (S&P) / Australian Securities Exchange (ASX)

[93] Stock Exchange of Singapore (SGX)

[94] Taiwan Securities Exchange (TSE)

This study has, however, specifically included all industries without excluding or stratifying for size, as well as dual-listed companies and companies with a primary listing other than the JSE, for the following reasons.

According to previous research, industry is a determinant of both disclosure (Lybaert, 2002) and the cost of equity (Collins & Abrahamson, 2006). Lybaert (2002: 220) described, tested and found preliminary evidence of a follower's effect. According to the follower's effect, companies are partly inspired by their competitors. Froidevaux (2004) reported results that show a stronger relationship between disclosure and cost of equity in the consumer discretionary and information technology industry than in the health care and industrial goods and services industry.

Collins and Abrahamson (2006: 75) compared the cost of equity over industries and over countries. In South Africa, the lowest cost of equity was reported for the financial industry (9.76) and the highest cost of equity for the information technology industry (17.49). Collins and Abrahamson (2006: 80) further concluded that the industry with the highest market capitalisation also had the lowest cost of equity in each of six countries that were studied (i.e. Egypt, Kenya, Morocco, Namibia, Zimbabwe and South Africa).

Previous research further found size to be a determinant of disclosure (Bollen *et al.*, 2006) and the cost of equity (Hail, 2002; Froidevaux, 2004), with a positive association between size and disclosure and a negative association between size and the cost of equity.

Froidevaux (2004) found a negative and significant association between disclosure and the cost of equity for a large company sub-sample, but no (although negative) significant association for a small company sub-sample. Based on the assumption that smaller companies would have a lower analyst following, conflicting results were reported by Botosan (1997) that found a significant negative relationship between disclosure and the cost of equity for companies with a low analyst following (i.e. smaller companies), but no relationship for companies with a high analyst following (i.e. larger companies). It should be noted that Froidevaux (2004) measured disclosure via the investor relations sections of corporate websites, while Botosan (1997) measured voluntary disclosure via annual reports. Although both studies were conducted in the US, Botosan (1997) examined only manufacturing companies, compared to Froidevaux (2004) who examined four industries (health care, industrial goods and services, consumer discretionary and information technology).

Agarwal *et al.* (2016) reported results that support the findings of Botosan (1997). Agarwal *et al.* (2016) reported a significant positive association between investor relations quality and analyst following for smaller companies, but no similar significant association for larger companies. Lang and Lundholm (2000: 627) limited their sample to small companies. They argued that smaller companies were more likely to use their disclosure policy to influence market perceptions, and that it would be easier for the researchers to capture their disclosure activities more completely.

Dual-listed companies – and specifically companies with a primary listing other than the JSE which would be governed by jurisdictions other than those governing companies with only a JSE listing (e.g. stock exchange listing requirements and Companies Act) – were included in the population defined for this study (see Table 4.2 below), for the following reasons.

According to previous research (Celik *et al.*, 2006; Aly *et al.*, 2010), a significant positive association could be expected between listing status and disclosure. Further, research showed that the countries examined affected not only the determinants of disclosure (Pervan, 2006),[95] the relationship between disclosure, and information asymmetry (Orens *et al.*, 2010),[96] but also affected the cost of equity (Collins & Abrahamson, 2006).

Research questions 2 and 3, as set out in Section 1.3.2 of Chapter 1, both refer to 'variations in IIR levels'. An important objective with the selection of the sample was therefore to ensure sufficient cross-sectional variation. The population was therefore defined to include all industries, all company sizes and all JSE-listed companies, irrespective of primary listings, to ensure such cross-sectional variation.

However, as discussed in Chapters 5, 6 and 8, and specifically in Section 9.5.3, the inclusion of smaller companies (e.g. AltX) and companies with a primary listing other than the JSE did impose certain limitations on the study, though not insurmountable, for instance low share trading and negative betas for smaller companies and different listing requirements for companies with secondary JSE listing.

To answer the research questions, this study required financial and market-related data from the INET BFA database. Based on a list received from the JSE, there were 382 companies listed on the JSE on 18 August 2014. Given the information needs of this study, 67 companies were removed for various reasons, as summarised in Table 4.2.

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[95] Using the same measurement instrument, Pervan (2006) reported different significant associations for the following independent variables between their Croatian and Slovene samples: market-to-book ratio, return on assets, ownership dispersion and trading volume.

[96] Orens *et al.* (2010) found a significant negative association between disclosure and information asymmetry for continental European countries, but found no similar significant association for northern American companies. See Table 6.3 for more detail.

Table 4.2: Population available for the selection of the sample studied

Detail	Number
Companies listed on the JSE as on 18 August 2014	382
Companies listed, but suspended	26
Companies not listed in one of the 10 main industries (super-sector classified as debt)	10
Companies with no share trades	4
Companies that did not publish an 2013 annual report	16
Companies with no working website	5
Companies sharing websites	6
Population available for the selection of the sample	315[97]

As a first step, 26 companies were removed as these companies had been listed, but were suspended as on 18 August 2014. Another 10 companies were removed as these companies were not listed in one of the 10 JSE industries.[98] The super-sector for these companies was given as debt and consisted of preference shares. These companies were either also included in one of the 10 main industries or had only preference shares listed. Four companies were removed from the population as no shares had been traded on the JSE since inception date. For these companies no market data (e.g. average spread and share turnover) were available. All four of these companies were listed on the AltX. Another 16 companies were removed as these companies did not publish a 2013 annual report. These companies were removed as no financial statement data was available for 2013.

Given research question 1, which entails a content analysis of corporate websites, all companies that did not have a dedicated, working website were removed from the population. Lastly, where two or more related companies shared a corporate website (i.e. had the same web address), the smallest company, in terms of market capitalisation, was removed from the population.[99] Web addresses for the majority of companies were available from the INET BFA database. Where no web address was available from INET BFA, the following procedure was followed. First, Sharenet and Moneyweb were consulted. If no address was available, a Google[100] search was done. Only the first 30 search results were considered. All web addresses were tested, resulting in the removal of five companies without working websites and six companies that shared the same website.

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[97] 382 - 26 - 10 - 4 - 16 - 5 - 6 = 315

[98] Basic material, consumer goods, consumer services, financials, healthcare, industrials, oil & gas, technology, telecommunications and utilities.

[99] The only exception was where Octodec Invest Ltd acquired control over Premium Properties Ltd, resulting in the subsequent trade suspension of Premium Properties Ltd.

[100] According to Search Engine Land (available at: http://searchengineland.com/google-worlds-most-popular-search-engine-148089), Google is the world's most popular search engine with a market share of 65.2% at the end of 2012 compared to Baidu (8.2%), Yahoo (4.9%), Yandex (2.8%) and Microsoft (2.5%). Therefore only Google was used to search for corporate websites where necessary.

To summarise: the population was defined as all companies currently listed on the JSE that had not been suspended, had traded since inception date, had published 2013 annual reports, and had a dedicated, working website. As a result of these criteria, only 315 of the 382 companies currently listed on the JSE were included in the population for the selection of the sample. These 315 companies were spread over the five JSE boards as follows (number of companies in brackets): Main board (271), AltX (40), Development Capital Market (DCM) (1), Venture Capital Market (VCM) (2) and Black Economic Empowerment (BEE) (1).

4.2.2 Sample selection

The sample technique that was used was stratified random sampling with proportional allocation. Using the relative frequencies of JSE industries in the population, the population was stratified into industries. The sample selection process was then done as follows. Numbers were assigned to companies per industry; random numbers were generated using Excel; and, according to these random numbers, companies were included in the sample. A total of 85 companies were included in the sample. The population number of companies per JSE industry as well as the sample distribution over the JSE industries is summarised in Table 4.3.

Table 4.3: A comparison of the population and the selected sample size per industry

JSE Industry	Population	Sample
Basic materials	66	17
Consumer goods	25	7
Consumer services	36	10
Financials	82	21
Healthcare	8	3
Industrials	74	19
Oil and gas	3	1
Technology	15	4
Telecommunications	5	2
Utilities	1	1

As discussed in Section 4.2.1 only companies with working corporate websites were included in the population. Technically all sample elements ‘replied’ and there were therefore no non-responses.

4.3 VERTICAL ANALYSIS

For each of the 346 attributes, 85 scores, ranging from zero to one, were summed to calculate an average availability per attribute. In total, 29 410[101] attributes were measured. Table 4.4 summarises how the 29 410 attributes were measured.

[101] 346 x 85 = 29410

Table 4.4: Allocation of IIR scores: available, partially available and absent attributes

Category	Score	Number	Percentage
Attributes available	1	7 792	26.5%
Attributes partially available (not fully usable) (U-Yes)	0.5	141	0.5%
Attributes partially available (outdated) (T-Yes)	0.5	147	0.5%
Attributes partially available (breadth and depth)	0.5	785	2.7%
Attributes not available (i.e. absent)	0	20 545	69.9%
Total attributes		29 410	100%

In total, 346 attributes were assessed as U-No and 324 as T-No and were included in the 20 545 absent variables, as per Table 4.4. U-No refers to attributes where a link or download is available, but either the link is: (1) not functional (e.g. “this page can’t be displayed” or “HTTP 404”); (2) access is denied (e.g. password is required); (3) only link title is provided with no hyperlink (e.g. “click here for more information about directors”, but no hyperlink is available); or (4) the link is functional, but linked to irrelevant information (e.g. link title is “website disclaimer”, but the link is to the investor relations section landing page). Such attributes were assessed as absent. All U-No links were re-assessed to ensure the correct assessment.

T-No refers to attributes that were either outdated for more than five years (e.g. reference to only the 2010 credit rating) or were considered outdated given the specific attribute that was measured (e.g. attribute “current SENS” assessed as T-No as only archived Stock Exchange News Service – or SENS were available). Such attributes were assessed as absent.

U-Yes refers to attributes where information was not complete (e.g. functional link to King III report was provided, but only Chapter 2 was available); inconsistencies occurred (e.g. board committees listed in two website sections differed); page layouts were extremely poor; only some links were functional (e.g. out of the five links to provide more information about the products, only two were not functional); links were erroneously swapped (e.g. under sustainability two links were listed, one for community and one for BBBEE, community linked to BBBEE and BBBEE linked to community); and poor use or no use was made of applicable categories (e.g. SENS, press releases and news items published by the financial media were mixed under one category ‘news’ with no clear distinction).

T-Yes refers to attributes outdated for more than a year (excluding archived, related attributes) (e.g. shareholder information) or outdated links (e.g. the “for more information about directors” link linked to the 2012 integrated annual report).

U-Yes and T-Yes attributes were assessed as being partially available (0.5). In total 141 attributes were assessed as U-Yes and 147 as T-Yes. Although the utmost care was taken to ensure a consistent and fair measurement, some subjectivity was involved with the assessment of attributes

as only 'partially available' based on usability and timeliness. It should, however, be noted that, as shown in Table 4.4, only a small percentage of the total attributes were assessed as respectively U-Yes (0.5%) and T-Yes (0.5%).

In addition to U-Yes and T-Yes attributes that were measured as partially available, 50 of the 346 attributes were from the outset measured as available (1), partially available (0.5) or absent (0) to improve the measurement of the breadth and depth of content. These 50 attributes are discussed separately in Annexure C. As per Table 4.4, 785 attributes were assessed as partially available.

Figure 4.1 shows the number of attributes that had an average availability of less than 10%, more than 10% but less than 20%, etc. Figure 4.1 shows that of the 346 attributes, 286[102] attributes had an average availability of less than 50%. Only 60[103] attributes therefore showed an average availability of 50% or more.

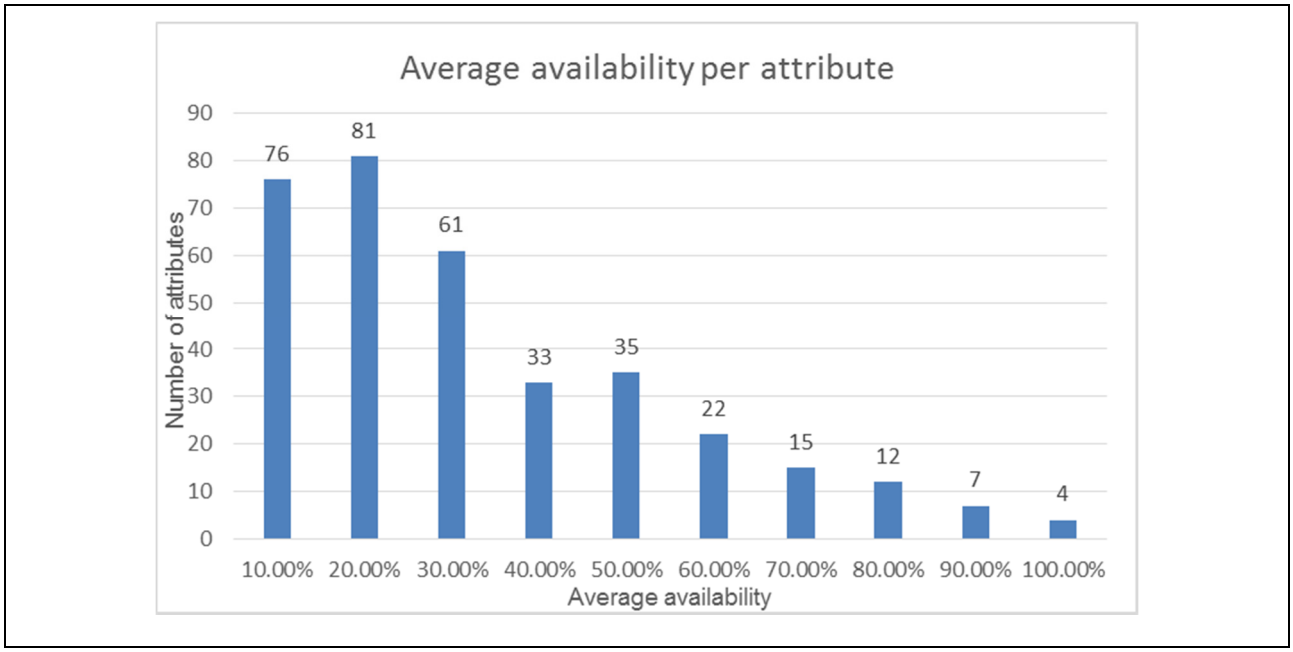

Figure 4.1: Average availability per attribute measured

To judge whether these low average availabilities could be associated with a specific category or categories of attributes, average availabilities were examined also per category. Table 4.5 shows the average availability per category, as well as the number and percentage of attributes per category that have an average availability of 50% or less and more than 50%.

Navigation and company information were the highest scoring categories, while investment case and bondholder information were the lowest scoring categories. In the navigation and company information categories, 36% and 32% of attributes, respectively, had an average availability of 50% or more, compared to 0% in the investment case and bondholder information categories. With the exception of bondholder information (7%), investment case (11%) and navigation (41%), the

[102] 76+81+61+33+35 = 286
[103] 22+15+12+7+4 = 60

remaining eight categories had scores between 20% and 40%. As these eight categories represented 87% of the total attributes, it was not possible to conclude that any specific category or group of categories had resulted in the low average availabilities.

Further all categories had between 64% and 100% of their attributes in the less than 50% category and between 0% and 36% in the 50% or more category.

As the number of attributes measured per category varied from as little as five (bondholder information) to 64 (financial information), the last column in Table 4.5 (distribution of the less than 50% attributes) measured the percentage distribution of the 286 attributes (i.e. attributes with an average availability of less than 50%) over the 11 categories. Although the financial information and shareholder information category attributes had the highest percentage contribution in the less than 50% category, they were also the two largest categories in terms of the number of attributes.

Table 4.5: A comparison of IIR scores per measurement instrument category

	Available attributes	**Average availability**		**Attributes with less than 50% average availability**		**Attributes with 50% or more average availability**		**Distribution of the less than 50% attributes**
		Number	**%**	**Number**	**%**	**Number**	**%**	
Sample	346	97.98	28	286	83	60	17	
Accessibility	13	3.59[104]	28[105]	10	77[106]	3	23[107]	3.50%[108]
Navigation	14	5.69	41	9	64	5	36	3.15%
Timeliness	12	3.99	33	10	83	2	17	3.50%
Company information	36	13.81	38	25	69	11	31	8.74%
Financial information	65	20.92	32	51	78	14	22	17.83%
Relevant news	23	7.68	33	18	78	5	22	6.29%
Investment case	26	2.78	11	26	100	0	0	9.09%
Shareholder information	60	16.23	27	50	83	10	17	17.48%
Bondholder information	5	0.34	7	5	100	0	0	1.75%
Corporate governance	50	14.54	29	41	82	9	18	14.34%
Corporate responsibility	42	8.42	20	41	98	1	2	14.34%

[104] Calculated as the average category score over the 85 sample companies.
[105] 3.59/13.
[106] 10/13.
[107] 3/13.
[108] 10/286.

Tables E1 and E2, Annexure E, show the 30 attributes with the highest and lowest average availabilities. These tables therefore reflect the minimum information that an investor can usually expect when visiting the website of a JSE-listed company, as well as the information that the investor will not find as such information is seldom available outside annual reports and presentations.

Although the majority of company websites have basic financial information (i.e. annual and interim reports, including archived reports), general company information (i.e. contact details, products and operating divisions), basic corporate governance information (i.e. about directors and King III report) and news (i.e. SENS), few companies provide any corporate responsibility information, bondholder information, shareholder services or information to improve their investment case.

Although companies generally provide a dedicated investor relations section on their corporate website, content is usually limited to financial results. Regarding the use of presentation technologies, the majority of companies do use some navigation tools (i.e. internal search function, breadcrumb trail, internal hyperlinks and clear homepage links) and have somewhat user-friendly homepages, but generally do not use any presentation technologies to improve the timeliness or accessibility of information.

The remainder of the vertical analysis will discuss the attributes in more detail, according to the 11 categories that were used to organise the attributes: accessibility (4.3.1), navigation (4.3.2), timeliness (4.3.3), company information (4.3.4), financial information (4.3.5), relevant news (4.3.6), investment case (4.3.7), shareholder information (4.3.8), bondholder information (4.3.9), corporate governance (4.3.10) and corporate responsibility (4.3.11).

4.3.1 Accessibility

For an investor who is unfamiliar with a company, the first step is to find the corporate website. A study that examined investors' use of corporate websites, showed that 40% of users tend to guess the Uniform Resource Locator (URL) (i.e. website address) of a company for which they are looking, compared to 36% that use Google, and 24% that use other search engines or internet directories (Seberger, 2006). Most (74%) corporate websites investigated in this study have a unique URL.

This study deemed the URL not unique if: (1) a similar URL existed for either a different company or a subsidiary of the company studied; (2) a different company used the same website address with only a different extension, and (3) the URL had no semantic relationship with the company. The following are examples:

i) The website address for Ellies Holdings Ltd (ELI) is www.elliesholdings.co.za, but a similar website address is used for a subsidiary that conducts e-commerce only, i.e. www.ellies.co.za.
ii) The website address for Micromega Holdings Ltd (MMG) is www.micromega.co.za, closely resembling www.micromega.com, which is the website address of an unrelated company that supplies audio products.
iii) The website address for AH-Vest Limited (AHL) is www.alljoy.co.za

Although various possible reasons exist for a company to use only one working website extension (e.g. co.za or .com), this dissertation argues that having both a working .co.za and .com extension could potentially increase website traffic. Website address extensions used by the study sample were as follows (number of companies): only .co.za (40), only .com (15), co.za and .com (25), .com.au (2), .mu (1), .co.uk (1) and .mu and .com (1).

For some companies (e.g. www.elliesholdings.co.za and www.elliesholdings.com) both extensions are functional, but for other companies either the .co.za automatically redirects to the .com (e.g. www.howden.co.za to www.howden.com) or the .com automatically redirects to the .co.za (e.g. www.astrapak.com to www.astrapak.co.za).

For a number of companies, the .com or .co.za extensions are already used by another company (e.g. www.bat.co.za is used by Net*Point and www.bat.com is the website address used by British American Tobacco (BTI)). For other companies the .com extension is still available and for sale (e.g. www.wbho.com) or simply not functional (i.e. “this page can’t be displayed”) (e.g. for www.illiadafrica.com).

This dissertation makes the argument that – although not essential for the finding of corporate websites – the use of a unique URL and having both a .co and .com working website extension can potentially improve accessibility. The majority of companies had a unique URL (74%), and only 29% had both a .co and .com working website extension.

Nielsen (1999) argues that the excessive use of graphics impacts negatively upon the user experience (as cited by Debreceny *et al.*, 2001). Excessive use of graphics, without a text-only option, may disadvantage users with visual and hearing impairments. As measured in this study and discussed in Annexure C, 33 (39%) companies surveyed either used excessive graphics on their homepage or excessive scroll-down was necessary to see all information and links on the homepage.

Specific user impairments (e.g. visual, hearing, cognitive and motor) may result in some formats being inaccessible to these users. Alternative formats (e.g. podcast and transcript of a conference call) should therefore be available. According to the IRS best practice guidelines, important content should be available in alternative formats.

It should be noted that alternative formats (e.g. e-reader, Excel downloads, webcasts and transcripts) were also measured separately in categories other than the accessibility category (e.g. see attributes 77 to 81 and 93 to 95 in Table D1, Annexure D). Therefore, as indicated in Table D1, Annexure D, for example, attributes four to six, measurement of these attributes excluded accessibility attributes measured elsewhere to prevent double counting.

Notwithstanding this measurement, average availabilities for all alternative formats measured under accessibility were less than 10%. Only five (6%) companies used specific presentation technologies (e.g. option to adjust font size) to improve accessibility for users with a visual impairment.

Corporate websites should be accessible to users with specific user impairments for a number of reasons (e.g. it is ethical, it improves website traffic, and it prevents discrimination). Some basic steps that companies could follow to improve accessibility to these users are to refrain from the excessive use of graphics without a text-only option; to make use of alternative forms of content (e.g. transcripts and podcasts); to introduce screen readers; and to offer the option of adjusting font size. As discussed above, few companies currently use these technologies to improve accessibility.

General website disclaimers, e.g. terms of use and privacy policy, were often used by corporate websites (55%), but only five (6%) companies used separate media or a forward-looking information disclaimer to make users aware of the fact, for example, that media articles published on their website might not include all media articles and that forward-looking information as published was not audited. It should, however, be noted that, as discussed in 4.3.6 (relevant news) and 4.3.7 (investment case), not all companies publish media articles or forward-looking information.

Further attributes used to measure accessibility included the use of a “print this page function” (22 (26%) companies used this function) and “recommend this page function” (26 (30%) companies used this function). Only thirteen (15%) companies ‘advertised’ specific support for users of mobile devices on their corporate websites. Eighteen (21%) companies presented website content in more than one language.

While it could be argued that from a cost perspective, providing website content in alternative languages may not be financially feasible, the vast majority of companies could improve accessibility by using inexpensive presentation technologies such as a “print this page” function or “recommend this page” function.

4.3.2 Navigation

Although separately categorised and discussed, navigation tools could also be viewed as presentation attributes that would improve the accessibility of information. The search function, FAQ, help function and sitemap are useful navigation tools that can assist users to find specific information they are looking for. The search function is the most popular navigation tool used, followed by the sitemap function.

Almost two-thirds (55 companies) made a search function available. Some companies, as measured with the attribute ‘ability to manipulate’, offered customised search functions to enable users to limit their internal search of the corporate website to specific information, e.g. annual reports or media articles or SENS. This attribute had an average availability of 9%.

Although 45 (53%) companies had a sitemap, sitemaps for nine companies were not fully usable (e.g. sitemaps were incomplete, inconsistencies existed between sitemap and corporate website structure, and sitemaps focused only on e-commerce offering only products and services). These nine companies were therefore awarded only 0.5 for the availability of a sitemap.

Few companies had FAQ or help functions with useful information for investors (12%), and even fewer (5%) categorised this information into categories to improve the navigation and accessibility thereof for users. Cookie policies were not often used by companies, or were used without explaining the concept to users.

The accessibility of information is as important as the availability of information. Given the large and complex nature of corporate websites, companies could easily improve the ability of users to find information by using navigation tools, such as a search function, sitemap, FAQ or even a help function. Although the majority of companies had used a least one of these functions, an astonishing 19 (22%) of companies had not used any of these functions to aid navigation.

According to Debreceny *et al.* (2001), hyperlinks and multimedia provide a different method of accessing information, which could be either sequential or non-sequential, compared to conventional hard copy information which is primarily sequential in nature. Although hyperlinks provide some flexibility, as discussed in Chapter 1, Section 1.2.5, they can result in disorientation and cognitive overload if not properly used. Internal (i.e. to other sections within the corporate website) hyperlinks were often used by companies, but only 38 (45%) of the companies used the drill down functionality offered by internal hyperlinks. Drill down links can be used as an effective tool to prevent information overload. To help prevent disorientation, users should always know where they are on the website and a 'back to the homepage' link should be clearly visible on all pages. Although both these functions were available in the case of the majority of company websites, 35 (41%) companies used neither breadcrumb trails[109] nor navigation panels[110] to help users orient themselves on webpages, and 12 (14%) companies did not have 'back to homepage' links on all webpages.

Company websites often made use of external hyperlinks to other websites. As many as 50 (59%) companies supplied at least one external link as information source for more information about subsidiaries, a business segment or the parent company. However, only two companies warned users that they were about to leave the corporate website and that the external hyperlinks would be taking them to websites not maintained by the company.

Although the use of hyperlinks (providing the drill down functionality) can improve the ability of users to find information, it can also compromise their ability if used inappropriately. Disorientation (i.e. where users get lost on websites) and lack of clear boundaries were discussed as disadvantages of corporate websites in Section 1.2.5. Even though companies could do far more to prevent disorientation, few use basic navigation functions to this effect.

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[109] Breadcrumb trails track and display pages in the order in which pages were viewed by a visitor, e.g. Home page > About us > Board of directors > Executive directors > John Doe.
[110] Hyperlinked menu of sub-links that appear on either the left or right hand side of a webpage.

4.3.3 Timeliness

An important potential advantage of corporate websites is the provision of timely and therefore regularly updated information to investors. Ettredge, Richardson and Scholz (2001: 150) described the use of the Internet for investor relations as providing individual investors with timely information which was in the past only available to an exclusive group of investors (i.e. analysts and institutional investors).

For investors to judge the timeliness of information, it should be dated. In some cases, undated information may be misleading or even useless. Only 24 (28%) companies clearly dated information (e.g. "last updated on …") such as shareholder and dividend information and the market capitalisation. Another attribute that may give some indication of timeliness is the provision of a copyright date on the homepage. Only 54 (64%) companies provided a copyright date on their homepage, with only 40 (47%) of these copyright dates being either 2014 or 2015.

Instead of clearly dating information, companies can emphasise timeliness by clearly labelling information as being 'the latest' or by having a dedicated area or areas on the homepage for the latest information. Of the five timeliness indicators measured, only one, share price, had an average availability of more than 50%.

Only 36 (42%) companies provided an e-mail alert service to which users could subscribe for updated information. Of these 36 companies, only 11 offered website users specific categories to choose from regarding the areas for which they would like to receive e-mail updates (e.g. company news, SENS, annual results, dividend information). Subscribing to a RSS[111] feed removes the need for investors manually to check corporate websites for new content. Only nine (11%) companies however offered their corporate website users the option to subscribe to RSS content feeds, but for two of these companies this function was assessed as absent (0). For one company, the RSS link was not functional (displaying the words "500 view not found") and for the second company an RSS link was available, but it merely acted as an internal hyperlink to the press office.

Only one company provided an option for its users to synchronise their own calendars with the company's financial calendar. Such an option automatically populates corporate website users' personal calendars with company scheduled events (e.g. release of annual results, presentations, annual general meetings and dividend payment dates).

This dissertation measured timeliness in three ways: firstly, whether companies dated information to enable users to judge the timeliness and usability of information; secondly, whether companies promoted, or directed users to, updates by clearly labelling information or links as 'the latest' (e.g. in the case of the latest financial statements or updates), and finally, whether presentation technologies (e.g. an e-mail alert service, RSS content feed and calendar sync option) were used to improve the

[111] Really simple syndication or rich site summary.

flow of the latest information to users. Overall, the results show that companies can improve timeliness by dating information supplied on websites, by directing users to the latest information, and by providing functionalities such as an e-mail alert service and RSS content feed.

This dissertation, however, did not attempt to gauge whether information supplied on corporate websites was in fact the latest information or how quickly companies provided newly available information on their websites.

4.3.4 Company information

According to the IRS best practice guidelines, telling the company story is one of the main functions of the corporate website (IRS, 2013). Although the majority of companies provided a dedicated 'about' or 'about us' section with information about their operating divisions, their products and services, and their customers, few companies provided information about their vision, mission, objectives, critical success factors and their suppliers. Though almost all (except three) companies provided contact details, only 60 (71%) provided the ever-important company e-mail address. While 43 (51%) of companies provided a dedicated history section, an astonishingly low, 15 (35%) companies had not updated their company history within the last two years.

More specifically, company information results are discussed below in ten sub-categories: dedicated 'about us' link, history, contact details, organisational chart and group structure, vision and mission, customer information, products and services, suppliers, properties and critical success factors.

4.3.4.1 Dedicated 'about us' link

The majority of companies (72%) had dedicated homepage links to either an 'about us' (51%) or 'about' (21%) section. The remaining companies did provide company information under various other links (e.g. corporate profile, group, the company, profile, 'who we are', company profile and 'the company'), but only the 'about us' and 'about' links were measured, being deemed best practice. Most companies provided information such as a homepage summary of HTML information about the company (64%) and the date the company was founded (67%), but only six (7%) companies provided either a corporate webcast or podcast as introduction to the company's business and 15 (18%) companies gave a dedicated fact sheet that summarised important company information such as the company business, recent results, directors and share price, and dividend history. One company did provide a link to a corporate video, but the link was not functional (with the message appearing "this video does not exist") and the attribute was therefore assessed as being absent. Three fact sheets were last updated 12 months earlier or contained only outdated information (older 12 months), resulting in a score of 0.5.

4.3.4.2 History

Only 43 (51%) companies provided a dedicated company history section on their corporate websites. Important information that companies can communicate via this section include: date listed, name

changes, important acquisitions and disposals, and geographical expansions of the company business. Only 15 (35%[112]) companies that provided history had updated their company history sections within the last two years.

4.3.4.3 Contact details

Only three companies provided no contact details (i.e. neither telephone number nor e-mail address nor online form to complete). Only 71% of companies provided a company e-mail address and only 32% provided separate investor contact details.

4.3.4.4 Organisational chart and group structure

An organisational chart outlines the roles, responsibilities and relationships between employees (i.e. internal structure of a company). Only six (7%) of the companies provided an organisational chart. Although almost 70% of companies provided information about their operating divisions, only 30 companies provided a group structure (i.e. subsidiaries, associates and other investments).

4.3.4.5 Vision and mission

Although 42 (49%) companies had either a dedicated homepage link or sub-link (usually under the 'about us' or 'about' section) to either one or a combination of the attributes measured in this category (i.e. vision, mission, strategy, business model, objectives and values), the average availability of these attributes was a mere 30%, with the highest average availability (42%) for reference to strategy and the lowest (11%) for a quantitative discussion of the strategy.

4.3.4.6 Customer information

More than 50% of companies reported some description or profile of their customers (62%) and provided either a map or list of their geographical presence (57%), but only 12 (14%) companies provided a list of their major customers.[113]

4.3.4.7 Products and services

Although the majority of companies did publish at least a list of their major products and services (76%) with a brief description thereof (60%), only 24 (28%) provided dedicated and descriptive downloads with detailed product and/or services information.

4.3.4.8 Suppliers

Few (16%) companies provided any reference to their suppliers or business partners (such as a list, description or brief discussion of relationships).

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[112] 15 / 43

[113] For the purpose of this measurement, customers were defined as widely as possible to also include industries or companies that would use or retail the companies' products, and not only end-users.

4.3.4.9 Properties

Only 32% of companies provided a list or reference to major factories or warehouses or properties (e.g. administration headquarters or distribution centres), while only 25% provided some description and 27% provided photos thereof. Only four (5%) of the companies provided a virtual visit (including videos) to provide information of these properties to investors.

4.3.4.10 Critical success factors

Only 12 (14%) companies provided a reference or brief description or list of critical success factors.[114]

4.3.5 Financial information

Although almost all companies published their latest annual and interim reports, as well as archived reports (as PDF downloads) and just over 50% provided PDF slides of annual and interim results presentations, less than half of the companies provided additional financial information to aid financial analysis, such as financial ratios and key performance indicators. Few companies, however, made any attempt to improve the accessibility of information either by providing dedicated and descriptive hyperlinks to information inside PDF reports and presentations, by providing homepage links to promote available information, or by using alternative formats such as HTML financial statements hyperlinked to notes and spreadsheet downloads of financial information or transcripts and podcasts of results presentations.

Financial information results will now be discussed in more detail in four sub-categories: financial reports, presentations, financial analysis, and archives.

4.3.5.1 Financial reports

Almost all companies published annual financial statements and/or[115] integrated annual reports (96%) and interim reports (88%) as PDF downloads. However, few companies provided any alternative formats or dedicated homepage links to these reports or updated financial information since the latest annual, integrated or interim report was published. According to the IRS best practice guidelines, important content should be available in alternative formats (e.g. both PDF and HTML).

Interviews with fund managers and analysts revealed that the majority of these users prefer their documents in PDF format, with only the minority preferring HTML type documents (Jones, 2009). According to a survey by Beattie and Pratt (2003) expert users (i.e. investment analysts and fund managers) prefer spreadsheet downloads and are less in favour of HTML and PDF file formats. Private shareholders ranked HTML as the most preferred file format and PDF the least. Gassen

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[114] Measurement or quantitative information was measured separately under the financial information category, and any strategy or implementation issues under the investment case category.

[115] Although JSE-listed companies are required to publish an integrated annual report, some also publish annual financial statements. Companies with a primary listing other than the JSE publish mostly annual financial statements. Most (82%) companies publish an integrated annual report and 44% publish annual financial statements.

(2001: 20), on the other hand, reports experimental research results that strongly suggest that participants prefer HTML reports over PDF reports. In the Gassen study, participants were required to answer specific questions from financial reports. Participants were able to answer questions faster and with fewer mistakes using HTML compared to PDF reports. Based on these results, Gassen (2001: 20) argues that these alternative formats are not mutually exclusive.

The following five attributes (average availability percentage given in brackets) were used to measure alternative formats to the PDF annual financial statements or integrated annual reports: e-book (also called e-reader) (18%), online mini results site (35%), HTML (24%), HTML financial statements hyperlinked to notes (15%) and spreadsheet (i.e. Excel) downloads (11%). Online mini results sites are dedicated sections on corporate websites for financial reports. Although they all differed – for instance, some provided HTML financial statements and some only provided PDF downloads – they all attempted to improve the navigation and accessibility of the various sections of reports by providing separate links to the main sections of the annual reports (e.g. operations, corporate governance, sustainability and financial results). HTML financial statements that are hyperlinked to notes improve navigation and can prevent information overload by linking each financial statement line item to a financial note or set of notes for more information (i.e. drill down).

Only 14 (16%) companies provided at least one alternative format[116] to the PDF interim annual report. As interim reports contain significantly less information than annual financial statements or integrated annual reports, alternative formats were not measured separately.

A direct homepage link to financial reports can improve the accessibility thereof to investors. Only 34% and 21% of corporate websites provided direct homepage links to the annual or interim reports respectively. Given the importance of the auditor's and chairman's report, two attributes measured whether the auditor's reports were available via a separate link (e.g. via online mini results site) and whether the auditor's reports were linked to financial statements, and one attribute measured whether the chairman's reports were available via separate link or not.

Although the auditor's report is part of the annual financial statements or integrated annual reports, separate links will improve the accessibility thereof. Only 18% of corporate websites provided a separate link to the auditor's report and only 8% provided one or more hyperlinks to the financial statements that were audited. Only 32% provided a separate link to the chairman's report. Although companies can use internal links to any specific sections of the annual financial statements or integrated annual reports to improve the accessibility thereof (e.g. "for more information about the intangible assets, click here"), only 11 (13%) companies used such links and, of these companies, two companies provided outdated links, which were assessed as only 0.5.

[116] The following were assessed as alternative formats: e-book, spreadsheet download (e.g. Excel), online mini results site and html financial statements.

4.3.5.2 Presentations

Results presentations refer to presentations held by the company to present annual and interim results (quarterly results presentations were not measured). Investor presentations[117] (all other presentations, excluding annual general meeting presentations) were measured under the investment case category. Annual general meeting presentations were measured under the shareholder information category.

The majority of companies provided PDF slides of annual and interim results presentations (respectively 58% and 55%), but, as with financial reports, few provided alternative formats. Specific user impairments (e.g. visual, hearing, cognitive and motor) may result in some formats being inaccessible to these users. Alternative formats (e.g. podcasts and transcript of a conference call) should therefore be available. Few companies however provided alternative formats. Webcasts were the most popular alternative format with an average availability of 19% for annual report presentations and 15% for interim report presentations. Second were podcasts with 10% average availability (annual) and 15% (interim), and last were transcripts with 6% for both annual and interim. According to a survey done by Jones (2009), the provision of transcripts was the most frequently mentioned alternative format among fund managers and analysts.

To improve the accessibility of presentations, around one-third of companies used dedicated and descriptive links for presentations. Only 16% and 15% of companies, however, provided direct homepage links to annual and interim results presentation slides, respectively.

4.3.5.3 Financial analysis

Three different types of attributes were measured under the financial analysis category: financial highlights or summaries, financial ratios, and key performance indicators. As in the case of financial reports and presentations, not only the availability of the attributes was measured, but also the use of presentation technologies and links to improve the accessibility thereof. In descending order, average availabilities were as follows: share price related ratios (49%), financial statement-related summaries or highlights (46%), financial ratios (excluding share price-related ratios) (37%), and key performance indicators (20%).

The following ratios were measured as share price-related ratios: earnings per share, dividends per share, price/earnings ratio, share return, and share liquidity. The financial ratio availability of 37% applied to companies that provided at least one financial ratio. The average availability of companies that provided two, three of four ratios were 28% and for five and more ratios it was 14%. Examples of financial ratios included the current ratio, debtors' days, inventory days, creditors' days, return on equity, return on assets, solvency ratio, and interest cover. Only eight (9%) companies had organised

[117] Examples of investor presentations are roadshows and operational reviews.

these ratios in relevant categories (e.g. liquidity, solvency, and profitability) to improve the navigation thereof.

Only 20% of companies provided at least one key performance indicator (KPI). The following ratios were counted as being a KPI ratio: ratios clearly labelled as KPIs and ratios under headings such as, “how do we measure success?” or “measurement of critical success factors”.

The usefulness of highlights or summaries, ratios and KPIs is increased if the information is provided for more than one year. Few companies, however, provided a comparison with previous years. Only 16% (financial highlights or summaries), 20% (financial ratios) and 7% (KPIs) of companies provided archived information for more than one year on their corporate websites. As financial statements always include comparative information for one financial year, highlights or summaries, ratios and KPIs that were provided for only one archive year were ignored.

Dedicated and descriptive links or downloads were measured as presentation attributes that could improve the accessibility of information. Average availabilities were 24% for financial statement highlights or summaries, 41% for share price-related ratios, 22% for financial ratios and 8% for KPIs.

4.3.5.4 Archives

Four different types of attributes were measured under the archive category: annual results archives, interim results archives, annual and interim results presentations, and other investor presentations (excluding results presentations).

Almost all companies provided archived annual reports (94%) and interim reports (92%) for at least 25% of qualifying listed years[118] or three years, but only 52% and 45% provided archived annual and interim reports respectively for all qualifying years or 12 years. As with financial reports (see Section 5.3.5.1 above), few companies provided alternative formats to the PDF report. Only 25% of companies provided at least one alternative format (e.g. HTML, spreadsheet or e-reader) for the first annual report archive year and 16% for the first interim report archive year.

Companies which provided annual results presentation slides generally also provided archived slides with an average availability of 60%, 55% and 48% for the first, second and third archived years respectively. Although 31% of companies provided at least one investor presentation and 13% at least two in the past 12 months,[119] average availabilities of only 12%, 25% and 19% were measured for the first, second and third archived years respectively.

As with presentations (see Section 4.3.5.2 above), few companies provided alternative formats[120] to PDF presentation slides, with average availabilities of only 25%, 11% and 4% measured for companies that provided at least one, two or three alternative formats for either results or investor

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[118] Qualifying years is defined in Annexure C (Measurement Conventions).
[119] Investor presentations provided for the past 12 months were measured under the investment case category and only archive investor presentations were therefore measured here.
[120] The following were assessed as alternative formats: webcasts, podcasts and transcripts.

presentations. To improve accessibility and navigation, 41 (48%) companies organised their archives either per annum or used a filter to improve the accessibility to specific archives.

4.3.6 Relevant news

This category distinguished between three types of news: SENS[121], media (or press) releases prepared by the company, and news published in the financial media. Some companies did not make any attempt to distinguish between these categories. Some provided SENS, media releases and news published by the financial media in one list under one heading. Given the distinct nature of these categories, this study assessed such cases as not fully usable (refer to Section 1.2.2 in Annexure C).

Although the majority of companies provided SENS information on their websites, only 41 (48%) companies published media releases and only 21 (25%) re-published news published in the financial media. Even though the content thereof was not examined in this study, 33 (39%) companies promoted their use of at least one of the following social media channels on their website: Twitter, YouTube, LinkedIn and Facebook.

Similar to the situation with financial information, few companies made any attempt to improve the accessibility of news items, for example, by categorising news items per annum or providing search or filter options, by offering alternative formats (e.g. podcasts), or by providing dedicated contact details of the public relations department for the public and media. Only 34 (40%) of companies provided such contact details.

Results will now be discussed in more detail in three sub-categories: SENS, media releases prepared by the company, and news published in the financial media.

4.3.6.1 SENS

JSE listing requirements oblige companies to use SENS to publish corporate news or price-sensitive information prior to using any other media outlet (JSE, 2016a). The majority of companies also provided current (75%) and archived (68%) SENS information on their corporate websites. To improve the accessibility and navigation of SENS information, 44 (52%) companies categorised archived SENS information per annum and 14 (16%) provided an option for users to manipulate SENS information, for instance to search or filter for specific topics within SENS articles. The attribute ‘dedicated SENS link’ measured whether companies provided direct access to SENS via a homepage link (18 companies (21%)) or via a sub-link under another category (e.g. ‘about us’ or ‘investor relations’) (53 companies).

[121] Stock Exchange News Service.

4.3.6.2 Media (press) releases made by the company

The availability of media releases[122] was measured for the current year (i.e. the past twelve months) and two archive years. Although 41 companies provided media releases for the current year, 12 of these companies did not clearly distinguish between media releases made by the company and news published in the financial media. Similar results were documented for the two archived years. Regarding the use of alternative formats, only six (7%) of the companies used pod- or webcasts to communicate news to investors.[123]

A survey by Investis in 2013[124], found that 54% of companies globally[125] use social media for corporate or investor relations communications. According to Investis, the three most important social media platforms for investor relations communications are Twitter, YouTube and LinkedIn. Less popular mediums are Facebook, Google +, Flickr and Slide Share. The four most popular social media channels used by companies in this study, in descending average availability, were: Twitter (28%), LinkedIn (24%), Facebook (22%) and YouTube (16%). A small number of companies used media such as Google+, Flickr, Pinterest, blogging, Instagram and Foursquare.

4.3.6.3 News published by the financial media

Compared to the number of companies that publish SENS and media releases made by the company, fewer companies re-publish news published by the financial media. Average availability for the current (i.e. the past twelve months) and two archived years ranged between 19% and 22% for printed material. A similar percentage (20%) was reported for companies that re-published or shared media webcasts (i.e. media interviews or discussions of a company).

4.3.7 Investment case

The IRS lists four attributes that should be included for a good investment case: corporate profile (i.e. history, products and services, geographical reach and industry), analysis of the company's markets and future trends, current sector challenges and an online investor pack (i.e. a summary of key information providing a motivation for an investment in the company). Although various attributes measuring corporate profiles had already been measured under the company information category, some additional attributes were measured here.

Investment case results are discussed in four sub-categories: investment pack, forecasts, industry and corporate profile. Of the 11 categories measured, the investment case category had the second lowest average availability (bondholder information was the lowest). None of the 26 attributes

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[122] Articles published by the media, financial results and SENS are separately measured and were therefore excluded here.
[123] Presentations and media interviews were separately measured and were therefore excluded here.
[124] Source: http://blog.investis.com/en/2013/11/iq-social-media-survey-q3-2013-54-of-companies-globally-using-social-media-for-corporate-ir-comms/
[125] A total of 1 200 international companies were included in the survey.

measured in this category had an average availability of 50% or more. The only two attributes that were provided by at least 25% of companies were accolades via awards and investor presentations (excluding results presentations).

4.3.7.1 Investment pack

Only 13 (15%) companies made some sort of investment pack available, giving reasons to invest in the company. Two companies provided outdated information (i.e. older than 12 months) and were therefore only awarded 0.5, as discussed in Section 1.2.2 in Annexure C.

4.3.7.2 Forecasts

With average availabilities ranging between 2% (cash flow forecasts) and 18% (production, sales or profit forecasts), it is clear that few companies opted to provide forecast information outside presentations, annual reports and news items.[126] Regarding marketing opportunities, only five (6%) companies referred to future marketing opportunities (i.e. expansion in sales or geographical reach) that were being investigated by the company. Only two companies provided a dedicated link to forecast information. Therefore, most of the small number of companies that did give this forecast information provided the forecasts as part of another link (e.g. 'about us') or another document (e.g. fact sheet or corporate brochure).

Though not a forecast, 12 (14%) companies did indeed provide some form of updated financial information since the last annual or interim results were published.

4.3.7.3 Industry

Only 15 (18%) companies provided information to describe the industry in which the company operates, and only four (5%) of the companies provided a forecast or discussion of expected future industry trends.

4.3.7.4 Corporate profile

Attributes that measured the history, structure, products and services, and geographical reach of the company have already been discussed in the company information category in Section 4.3.4. One quarter of companies provided details of at least one accolade via awards (e.g. product or service quality, research and development, financial reporting, sustainability reporting and marketing), customer testimonials or employee testimonials. Only seven (8%) companies discussed how they managed quality in the company, two (2%) strategies and plans for achieving critical success factors and two (2%) specific actions that were taken in this regard. Almost no companies provided information (either quantitative or qualitative) regarding their research and development activities and intangible assets outside annual reports, presentations and news items.

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[126] As discussed in Section 8.1 in Annexure C.

Although few companies provided forecasts, and industry and corporate profile information, as discussed above, nearly one-third of companies provided PDF slides of at least one investor presentation that was held during the previous 12 months. As discussed in Sections 4.3.5.2 and 4.3.5.4 above, investor presentations excluded result presentations and the presentations held at annual general meetings. The content of presentations was not examined, and it is acknowledged that they might have included relevant investment case information such as forecasts, industry discussion and reasons to invest, given the nature of these presentations. To facilitate navigation, 22 (26%) companies provided a dedicated and descriptive link for investor presentations.

Almost all of these investor presentations were, however, only available via PDF slides, with only one company providing transcripts and four companies providing either a pod- or webcast of investor presentations on their corporate websites.

4.3.8 Shareholder information

Even though almost 90% of companies had a dedicated investor relations link, the majority of companies provided less than 50% of the attributes measured under this category. Around 50% of companies published the following information on their websites: shareholder communication (e.g. circulars), company advisors (e.g. commercial bankers and sponsors), share price information (e.g. share price history and interactive charts), a financial calendar, and listing information. Very few companies, however, published any dividend information, information related to analysts (e.g. reports), shareholder information (e.g. principal shareholders) or minutes of shareholder meetings (e.g. outcomes of AGMs).

Although much of the information measured in this category was probably also available from other sources, this dissertation makes the argument that it is less convenient, more costly or more time-consuming for investors to access these sources. Furthermore, few companies made any attempt to promote the availability of shareholder information inside other sources (e.g. the annual report) or made any significant effort to create opportunities for investors to obtain relevant information (e.g. by providing a dedicated investor relations e-mail contact address, a manual explaining the procedures for persons who wish to request information or a reference to the existence of a shareholder relations policy).

Shareholder information results are now discussed in more detail in 13 sub-categories: dedicated investor relations section, contact details, shareholder communications, Promotion of Access to Information Act (PAIA), company advisors, analysts, share price information, dividend information, shareholder information, shareholder meetings, financial calendar, listing information and other shareholder services and information.

4.3.8.1 Dedicated investor relations section

Almost all companies (76 or 89%) had a dedicated investor relations link on their homepage. One company's link was, however, only visible after scrolling down through a range of e-commerce

information on the homepage and was therefore assessed as not being fully usable (thus 0.5 was awarded for the attribute). Although various alternative link titles were also accepted in this study (see Section 9.1 in Annexure C), 72%[127] of companies with dedicated links used either investor relations (36) or investors (19) to describe the link.

Content provided via the investor relations link varied significantly and, although some companies used the link as a portal to all relevant investor-related information, some provided only the minimum information (i.e. share price information) under the investor relations link, with separate homepage links for financial and corporate governance information.

4.3.8.2 Contact details

Though 54 (64%) companies provided a dedicated link for investor relations contact details, the type of contact details that were provided, as well as where the link could be accessed, varied significantly between companies. Among the companies that provided such a dedicated link, 31 (36%) provided the link as a sub-link under the homepage contact link, and 43 (51%) provided the link as sub-link under the investor relations section. Therefore, 20 (24%) companies (i.e. 31+43-54) provided an investor contact link under both the homepage contact and investor relations sections.

Of the 45 (53%) companies that provided an e-mail address, 25 provided only a general e-mail address (e.g. Investor@hunter.co.za) and 20 provided a dedicated e-mail address (e.g. JohnDoe@hunter.co.za).

Although only 20 (24%) companies provided a dedicated e-mail address, 38 (45%) provided the name of the person that could be contacted and 27 (32%) gave a job title for the contact person. Only one company provided detailed information of the investor relations department. One possible reason for this lack of detail could be that companies simply may not have an investor relations department and that the function is either outsourced or resorts under an existing department (e.g. finance). According to a survey of the investor relations function of UK-listed companies, only 20% had a dedicated investor relations officer (Marston, 1996: 482). Of the remaining companies, 32% had an investor relations function, but organised as part of another department and 48% had no investor relations function (either separate or as part of another department). Survey participants with an investor relations function (i.e. the 20% and the 32%) were asked to provide their job titles. These titles varied widely and included descriptions such as investor relations, corporate affairs, public relations, corporate communications, finance director and company secretary.

4.3.8.3 Shareholder communications

Although about 50% of companies provided general shareholder communications (e.g. circulars[128]), they were mostly scattered around the website. Only 28% of companies provided a dedicated section

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[127] (36 + 19) / 76

[128] Examples include rights issues, share consolidations and share splits and de-listings.

for such communications. Few companies provided newsletters or some form of online shareholder administration or communication,[129] with average availabilities of 14% for newsletters and 12% for online shareholder administration or communication respectively.

4.3.8.4 Promotion of Access to Information Act

According to the Promotion of Access to Information Act (PAIA), companies must publish a manual explaining the relevant procedures for persons who wish to request access to information. A total of 38 (45%) companies did provide access to this manual on their corporate website, but one company's link was not functional, one manual was outdated (i.e. 2012) and only 17 (20%) companies provided a descriptive link[130] to facilitate access to the manual.

4.3.8.5 Company advisors

Nearly 50% of companies provided a list of company advisors (e.g. sponsor, transfer agent, commercial banker, and external auditor). Significant variation existed between the places where the list was provided (e.g. under 'investor relations', 'about us' or 'contact details').

4.3.8.6 Analysts

Only 13 (15%) companies made a list of analysts available (that follow the company), and of these only 10 (12%) provided contact details for all the analysts (two companies provided contact details only for some of the analysts listed). Less than 10% of companies provided reports[131] that were published by these analysts (e.g. forecasts and buy/sell/hold opinions).

4.3.8.7 Share price information

Around 50% of companies offered share price information, such as a share price history (52%), volume traded (55%), interactive charts (45%) and market capitalisation (44%). Only 16 (19%) companies provided the option to compare the company's share price history with an index (e.g. JSE or Top 40 or Industry) and only 21 (25%) companies provided a share price calculator (e.g. to calculate the current market value of x number of shares or the share price growth of x number of shares bought on x date).

Although around a third (32%) of companies provided information relating to their capital structure (e.g. number and types of shares authorised and issued), only 11 (13%) companies referred to recent changes in the capital structure.

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[129] Examples include an online share register, online share management, and an online investor information order service.
[130] Examples of descriptive links are: information act, access to information act, and access to information manual. The following were deemed not to be descriptive links: PAIA, Section 51 Act, terms and conditions, privacy policy and disclaimer.
[131] Excluding credit ratings and industry-related reports that were separately measured under the bondholder information and investment case categories, respectively.

4.3.8.8 Dividend information

This study did not attempt to distinguish between companies that had and didn't have paid dividends in the previous financial year. Only 33 (39%) companies provided information about their latest dividend. Of these companies, only 13 (15%) provided information of important dividend dates (such as date declared, last day of registration to be entitled to receive the dividend, and date on which the dividend will be paid). Although 32 (38%) companies provided some dividend history (e.g. dividend payments over the last 10 years), only 10 (12%) companies provided a qualitative discussion of their dividend policy and only two (2%) provided quantitative dividend policy information (e.g. 'our policy is to maintain a dividend to earnings per share ratio of 0.2').

Six companies provided access to a dividend calculator (for ease of working out, e.g. amount of dividends that will be received by a holder of x number of shares), and two companies made reference to a dividend reinvestment plan.

4.3.8.9 Shareholder information

Few companies published shareholder information outside their annual reports. A total of 24 (28%) companies provided a list of their principal shareholders, while six provided outdated information (older than 12 months). Criteria used by companies to define a shareholder as 'principal' also differed and varied between the use of a percentage (e.g. all shareholders with an interest exceeding 5%) to a list containing top shareholders (e.g. the ten largest shareholders). These criteria were however not applied consistently by companies and some, for example use a 3% shareholder interest to define principle shareholders and others publish the largest five shareholders.

Only 14 (16%) companies provided shareholder analysis information (e.g. number of shareholders for different classes of shareholding percentages (<1%, 1% - 5%, etc.)), but again six (7%) provided outdated information and the criteria used to categorise or analyse shareholdings varied between companies.

4.3.8.10 Shareholder meetings

On average less than 10% of companies made information available about the outcome of annual general or general meetings (e.g. voting results). Only one company provided any reference to the availability of online participation of meetings.

Although 38 (45%) companies provided a date for their next annual general meeting, 15 (18%) of these dates were outdated and were therefore assessed as outdated (0.5.). Examples of outdated dates were company A that referred to the next meeting that "will be held 19 May 2015" in August 2015 and company B which stated that "the 2014 annual general meeting will be held 22 October 2014" in June 2015. Around a third of companies provided notices to annual general meetings (34%) and other general meetings (26%).

4.3.8.11 Financial calendar

A financial calendar can be used by companies to communicate important dates, such as the dates of the release of financial results, AGMs and dividend payments. For such a calendar to be useful, it should, as a minimum, include some future dates and be available via a descriptive link. The financial calendar of nine (11%) companies did not include any future dates and were therefore assessed as outdated (0.5). Only four (5%) of the 53 (62%) companies that did provide a calendar did not use a descriptive link[132] or homepage title to describe their calendar. A mere eight (9%) companies provided reference to closed or silent periods and only one company provided an option for investors to synchronise their own calendar with the company's calendar. The calendar synchronise option was measured under the timeliness category.

4.3.8.12 Listing information

More than 50% of companies made some listing information available, e.g. name of exchange listed (79%), date listed (59%) and any further listing or exchange information (52%). Only 22 (26%) companies provided a statement of listing requirements compliance regarding the exchange where listed (e.g. JSE). While this study made no attempt to distinguish between companies with an American Depository Receipts (ADR) programme, and those without, only 12 (14%) companies provided any reference to having an ADR programme.

4.3.8.13 Other shareholder services or information

Only seven (8%) companies offered a glossary of terms to explain concepts to investors (e.g. ex-dividend share price or price/earnings ratio). Only five (6%) companies provided access to a complete downloadable shareholder relations policy, with eight (9%) companies providing a mere reference or brief one- or two-page description of the existence of such a policy.

4.3.9 Bondholder information

Only 10 (12%) of the companies published bondholder information via a dedicated and descriptive link. Few companies provided any of the attributes measured here, with average availabilities ranging between 2% (debt presentations), 7% (information on listed debt instruments) and 11% (reference to credit ratings as issued by credit rating agencies). Only one company provided contact details for the treasury department.

4.3.10 Corporate governance

Compared to the 90%, 76% and 72% of companies that had provided a dedicated investor relations, news and 'about' or 'about us' link, only 58% of companies provided a dedicated corporate

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[132] Non-descriptive links for the purpose of this study were shareholder structure, shareholder services, unit holders' information and quarterly, annual and interim reports. Descriptive links used varied from shareholders' diary, investor diary, diary, investor calendar, shareholders' calendar, financial calendar, calendar, events calendar, events and unitholders diary.

governance link. Although many of the attributes measured in this category (e.g. information about directors, board committees and risk management) were also available in the integrated annual report, similar to shareholder information discussed in Section 4.3.9, this dissertation makes the point that it is less convenient, more costly or more time-consuming for investors to access these sources. Almost a third of companies did promote the availability of corporate governance information inside the annual report, however, according to the IRS best practice guidelines (IRS, 2013), it is no longer sufficient for companies simply to refer corporate website users to relevant parts of the annual report for corporate governance information.

Granting that a significant number of companies did provide a list of directors with basic biographical information (e.g. photographs, age, qualifications, experience, type of director and information about other directorships), only a small number of companies provided any information (i.e. outside the annual report) about directors' shareholdings, performance evaluation, remuneration or attendance of board meetings.

Although just over 50% of companies did provide a list of board committees, only half of these companies provided any further detail such as board charters and board membership. Almost none of these companies provided any information about the attendance and outcomes of board meetings. Even though almost all companies provided a King III compliance schedule, companies neglected to provide important corporate governance documents such as a code of conduct, memorandum of incorporation, insider trading and whistle-blowing policy.

Corporate governance information results are now discussed in more detail in 11 sub-categories: dedicated corporate governance links, corporate governance report, King III, directors, executives and management, board committees, management committees, code of conduct, memorandum of incorporation, insider trading policy, and whistle-blowing policy.

4.3.10.1 Dedicated corporate governance links

Thirty-six (42%) companies provided no dedicated corporate governance link and therefore no dedicated section for corporate governance information. Some of these companies provided corporate governance-related information, but the information was scattered over various sections of the corporate website. Of the remaining 49 (58%) companies, 13 (15%) provided a direct homepage link to corporate governance and 36 (42%) a corporate governance link as sub-link under a homepage link (usually 'about us' or 'investor relations').

4.3.10.2 Corporate governance report

Only three (4%) companies published a separate corporate governance report for the last financial year and only two companies archived corporate governance reports. Given the scope of integrated and annual reports, and the fact that integrated reports generally include the required corporate governance information, internal links to specific sections of corporate governance would improve the accessibility of such information (e.g. "for more information about the board of directors, please

click here"). Of the 28 (33%) companies that did provide such a link, one link was not functional and five links were outdated (i.e. not for the most current annual results). Four (5%) companies did provide an internal link to specific sections of a corporate governance manual, policy or charter (e.g. "for more information about the whistle-blowing policy, please click here").

4.3.10.3 King III

With an average availability of 71%, almost all companies provided either a complete King III compliance schedule or at least a reference to or summary of compliance. As discussed in Section 11.2.2., Annexure C, King III equivalents were also assessed.

4.3.10.4 Directors

Although 75 (88%) companies provided a list of directors, 11 (13%) companies' lists were assessed to be outdated, with only 0.5 awarded, as discussed in Section 1.2.2 in Annexure C. The following are three examples of lists that were assessed as outdated by this study. Company A listed Director A as a director, but the director had already resigned the previous year. Company B discussed the board of directors and referred to x number of directors, but listed only x-2 directors in its list. Company C had two lists of directors on its corporate website and, according to list one, x directors were serving, but according to list two, y directors were serving. Of the companies that provided a list of directors, 57 (67%) companies also provided photographs and 30 (35%) companies provided the age of directors.

The majority of companies provided further information (average availability) about their qualifications (64%), experience (63%), date appointed to the board (54%), board committees involved (42%), type of directorship (e.g. chairman, chief executive, chief financial officer) (81%) with a clear distinction between executive and non-executive directors (45%) and other directorships (73%). Thirty-seven (44%) companies provided the name of the company secretary. Only 13 (15%) companies provided a detailed policy of board responsibilities, with 18 (21%) companies providing only a brief reference or summary of board responsibilities, and the remaining 54 (64%) companies providing neither reference nor policy beyond the annual financial statement, integrated annual report or corporate governance report.

A few companies, however, provided information such as (average availability): policies regarding board membership (15%), compensation (6%), directors' ownership (8%), recent board appointments and retirements (5%), board meeting attendance (5%), directors' share trading (1%), and minutes of board meetings (1%).

4.3.10.5 Executives and management

Only 42 (49%) companies provided a list of executives and management, and only 34 (40%) companies provided photographs of their executives. Almost all companies that provided a list of executives also provided the responsibilities of executives and managers (e.g. head of marketing).

Slightly less than half of companies that provided this list, also provided information about executives' qualifications, experience and date of appointment.

4.3.10.6 Board committees

Just over half of the companies (55%) made a list of board committees (e.g. audit, risk, remuneration, health and environment, nomination, transformation, social and ethics and investment) available. In the case of the companies that had provided such a list, the number of board committees given varied significantly, with the average number of board committees being 4.25 and the standard deviation being 1.44. Some companies combined two or more committees, while others had separate committees (e.g. audit and risk combined, compared to separate audit and risk committees). Although 33 (39%) and 34 (40%) companies did provide board charters and board committee membership information respectively, only 15 (18%) companies provided complete charters and 22 (26%) listed the members of each committee. The remaining companies provided only summaries of charters and the policy used to govern board committee membership.

Risk management is a board responsibility. Twenty-three (27%) companies provided at least a brief summary or description of their risk management framework (one outdated). Ten (12%) companies provided at least a brief description of their remuneration policy (one outdated), and nine (11%) companies provided their board performance evaluation policy, but only three (4%) company's linked compensation to performance evaluation in some way. Regarding board attendance, only six (7%) companies provided attendance records for board committees (one outdated), and four (5%) companies provided outcomes of board committee meetings (one outdated).

4.3.10.7 Management committees

Almost no companies provided any information about management committee members and management committee charters, with average availabilities of 6% and 5% respectively.

4.3.10.8 Code of conduct

The International Federation of Accountants (IFAC, 2007) defines the code of conduct as follows:

> Principles, values, standards, or rules of behaviour that guide the decisions, procedures and systems of an organization in a way that (a) contributes to the welfare of its key stakeholders, and (b) respects the rights of all constituents affected by its operations

Twenty-nine (34%) companies published either a summary (7%) or a complete downloadable code of conduct (27%). Twenty-three (27%) companies also discussed the importance of having such a code for the effective management of the company.

4.3.10.9 Memorandum of incorporation[133]

The South African Institute of Chartered Accountants (SAICA, 2009) defines the memorandum of incorporation (MOI) as the document that "sets out the rights, duties and responsibilities of shareholders, directors and others within a company". As the MOI is required by the South African Companies Act and not all companies examined in this study are registered in South Africa, this study defines MOI also to include similar documents used by other jurisdictions (e.g. Articles of Association (UK) or Articles of Incorporation (US and Canada).

Twenty-eight (33%) companies made either their memorandum of incorporation or similar document, as discussed above, available on their corporate website.

4.3.10.10 Insider trading policy

Although 17 (20%) companies referred to or briefly described their insider trading policy (e.g. discussion of price sensitive dealings by directors), only three (4%) companies provided a complete policy.

4.3.10.11 Whistle-blowing policy

Twenty-one (25%) companies referred to or briefly described their whistle-blowing policy (e.g. how to report misconduct or corruption or how to raise concerns), but only eight (9%) provided a complete policy. Almost all of these companies (25 of the 29) provided relevant contact details (e.g. tip-offs anonymous).

4.3.11 Corporate responsibility

Similar to the 58% of companies that provided a dedicated corporate governance section, 59% provided a dedicated corporate responsibility section. Although many of the attributes measured in this category (similar to corporate governance) might also have been available in their integrated annual reports, few companies promoted the availability of such information. Even though not equally important for all companies examined, less than a third of companies provided an environmental or health and safety policy or report.

Although nearly 60% of companies published some sort of workplace-related policy, few companies provided any detail about their workforce (e.g. number, average age, breakdown, remuneration, and union affiliation). Notwithstanding the potential commercial value thereof, less than 50% of companies provided their latest BBBEE certificate or detail about their community involvement and stakeholder relationships.

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[133] The 2008 Companies Act of South Africa requires a memorandum of incorporation (MOI) to register a company. It replaces the articles and memorandum of association that were required by the previous Companies Act.

Corporate responsibility information results are now discussed in more detail in seven sub-categories: dedicated corporate responsibility links, reports, policies, BBBEE, employees, corporate citizenship and stakeholders.

4.3.11.1 Dedicated corporate responsibility links

Thirty-four (40%) companies had a direct homepage link to a dedicated corporate responsibility section and a further 16 (19%) provided a sub-link to such a section under a homepage link (usually 'about us' or 'investor relations'). Although the remaining 35 (41%) companies had therefore provided no dedicated section for corporate responsibility issues, some of these companies did provide corporate responsibility-related information, but the information was scattered over various sections of the corporate website.

4.3.11.2 Reports

Slightly more companies offered archived corporate responsibility reports (i.e. sustainability or social reports) (25%) compared to a current corporate responsibility reports (i.e. for the latest financial year) (21%). Given the scope of integrated and annual reports, and the fact that integrated reports generally include the required corporate responsibility information, internal links to specific corporate responsibility sections would improve the accessibility of such information (e.g. 'for more information about the stakeholders relationships strategy, click here'). Of the 20 companies that did provide such a link, one link was not functional and six were outdated (i.e. not for the most current annual results).

Few companies (average availability percentage given in brackets) provided the following as either a separate report or via a dedicated inside hyperlink to the relevant section in either the annual financial statement, integrated annual report or the corporate responsibility (i.e. sustainability or social report) report: environmental report (15%), health and safety report (12%), value added statement (8%), carbon report (24%), water usage report (16%), discussion of work-related accidents (18%), and progress made on environmental issues (11%).

Regarding alternative formats, only four companies (one not functional) provided a sustainability-related web- or podcast (e.g. interview with directors on sustainability issues). Further, some companies also provided information about compliance with the Global Reporting Initiative (GRI) (24%), United Nations Global Compact (UNGC) principles (9%), International Organization for Standardization (ISO) standards (14%), and the JSE Socially Responsible Investment (SRI) index (9%).

Additionally, in total 13 (15%) companies referred to compliance of at least one of the following: National Occupational Safety Association (NOSA) (three companies), National Environmental Management Act (NEMA) (one company), industry membership (sustainability-related) (six companies), and Occupational Health and Safety Assessment Series (OHSAS) 18001 (seven companies).

4.3.11.3 Policies

Some companies had a combined safety, health, environmental and quality (SHEQ) policy and others separated policies (e.g. an environmental policy, and a health and safety policy). The majority of companies (66%) that provided an environmental policy only gave a summary or brief description thereof (25 of 38 companies), with only 34% providing a complete policy. Thirty (35%) companies also provided some information about their environmental objectives.

Similar results were found for health and safety policies, where 26 (31%) companies provided only a summary or brief description, and merely four (5%) provided complete policies.

Of the companies that published these policies, 18 (21%) also referred to or discussed internal arrangements for implementing these policies, 16 (19%) provided contact details of executives responsible for these policies, and nine (11%) gave the details of the sustainability auditor that would provide assurance. Some companies also published a supplier code of conduct on their websites (18%).

4.3.11.4 Broad-based black economic empowerment

Of the 41 (48%) companies that made Broad-based black economic empowerment (BBBEE) certificates available, six (7%) provided certificates that were outdated (i.e. already expired). A further seven (8%) companies provided only a reference to their BBBEE status without providing a certificate. Thirty-three (39%) companies also provided some reference to either empowerment transactions and equity programmes or BBBEE partners.

4.3.11.5 Employees

Fifty (59%) companies published either a summarised (24%) or complete (7%) workplace policy or some sort of workplace-related policy (28%). Only 32 (38%) companies provided the number of employees (three outdated). Few companies provided any further details (average availability), such as work conditions (including development and teamwork) (24%), any breakdown (e.g. gender, nationality or race) (21%), staff turnover (16%), compensation policy (15%), temporary or permanent status of staff (11%), union membership (11%), employee costs (9%) and average age (4%).

4.3.11.6 Corporate citizenship

Although 47 (55%) companies (three outdated) referred to their community involvement (e.g. non-commercial projects in which they were involved), only 22 (26%) companies (four outdated) provided any quantitative information (i.e. amount invested), and 14 (16%) provided detail about sponsorship policies (e.g. criteria for donations). Ten (12%) companies provided a separate section for corporate citizenship-related news items.

4.3.11.7 Stakeholders

Only 29 (34%) companies offered some information about their stakeholders, with 11 (13%) providing only a list of stakeholders and 18 (21%) (three outdated) providing their stakeholder relationship policies or strategy.

4.4 CHALLENGES IN MEASURING INTERNET INVESTOR RELATIONS (IIR)

In the absence of standards to regulate IIR and consistent with previous research, considerable variation exists in terms of the information disclosed and the presentation technologies used. Significant differences in corporate website structures (e.g. number and type of categories used on homepages) also exist.

Although most companies used a relatively flat website structure with information organised in categories, some websites scattered related information over various webpages. The majority of websites that were examined were large and complex and, despite significant effort on the part of the researcher,[134] some attributes may have been overlooked. Such variations increased the difficulty of consistent measurements over all companies.

Some information was not usable (e.g. links not working or incorrect hyperlinks), and other information, while readily available, was extremely outdated. As briefly discussed in Section 3.3.3 and further discussed above in Section 4.3 and Annexure C, some attributes were measured as partially available as a result of their degree of availability and their timeliness.

Furthermore, companies did not use the same terminology to describe and to categorise information. Although the majority of companies, for example, did provide a dedicated section to describe their operations (e.g. products and services offered), various alternative link titles were used, for example operational profile, group overview, business, capabilities, operations, products and services, portfolios, brands, how we work, and trading divisions.

Some companies provided homepage links to dedicated corporate governance and corporate responsibility sections, others provided only sub-links under investor relations or the ‘about-us’ section. Some companies scattered corporate governance attributes over various sub-links (e.g. board of directors, executive committee and non-executive committee).

Although most companies with a dedicated corporate responsibility section used either sustainability or corporate responsibility as the link title, some companies used alternatives such as ISO[135] management, social responsibility, transformation, society, socioeconomic impact, corporate social responsibility, responsibility, and citizenship.

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[134] The average number of hours needed to do the content analysis per company was seven hours.
[135] International Organization for Standardization (ISO)

Not all companies examined had a primary listing on the JSE or were registered in South Africa. For these companies, different listing requirements and company laws would therefore prevail. Some attributes (e.g. King III and JSE listing requirements) were therefore defined also to include equivalents as required by other jurisdictions.

Although companies examined had on average been listed for 23 years, the number of years listed varied from two years to 75 years. Some companies would therefore simply have more information to provide than others. Some attributes (e.g. archived annual and interim reports and archived presentations) were therefore measured considering the number of years listed. Another example of where the measurement of attributes had to be adjusted to accommodate internal differences between companies was board committees. To measure how many board committee charters had been provided, the number of board committees had to be tallied, bearing in mind that some companies combined committees such as audit and risk committees, while others kept them separate.

4.5 RELIABILITY AND VALIDITY

As discussed in Section 3.3.6, reliability was assessed using Cronbach's alpha and by an examination of the correlation coefficients between disclosure categories. Construct validity was applied to validate the use of the measurement instrument.

4.5.1 Reliability

Cronbach's alpha was calculated for each of the 11 categories (Ac, N, T, Ci, Fi, Rn, IC, Si, Bi, Cg and Cr)[136] that were used in this study to categorise attributes and is shown in Table 4.6.[137] Although Cronbach's alpha for three categories (accessibility, timeliness and company information) is below the often suggested 0.7 (e.g. Serrano-Cinca *et al.*, 2007; Nunnaly, 1978; Kelton & Yang, 2008), it can still be viewed as acceptable given the alpha of 0.51 as reported by Gul and Leung (2004) and 0.64 reported by Botosan (1997). Gul and Leung (2004) did however admit that the low alpha reported by their results suggested that random measurement error could reduce the power of the empirical tests in their study. Part of the process in calculating Cronbach alpha is to determine the level of redundancy in the measurement instrument. No attributes have indicated significant redundancy. This implied that all attributes were kept for analysis, and further confirms the methodology discussed in Section 3.3.1 to measure as widely as possible to mitigate the risk of

[136] Ac refers to the accessibility category, N to navigation, T to timeliness, Ci to company information, Fi to financial information, Rn to relevant news, Ic to investment case, Si to shareholder information, Bi to bondholder information, Cg to corporate governance and Cr to corporate responsibility.

[137] The statistical software package, Statistica, that was used for this study allowed the calculation of Cronbach's alpha only for a maximum of 300 attributes. It was therefore not possible to calculate one alpha for all attributes. It should, however, also be noted that Cronbach's alpha increases as the number of attributes increase and, given the amount of attributes, it could be argued that such a calculation would not have been a reliable measurement.

important attributes being omitted. Also, as discussed in Section 3.2.4, the breadth or comprehensiveness of information is one of the indicators of the quality of IIR.

Table 4.6: Cronbach's alpha per measurement instrument category

Categories	Ac	N	T	Ci	Fi	Rn	IC	Si	Bi	Cg	Cr
Number attributes	13	14	12	36	65	23	26	60	5	50	42
Cronbach's alpha	0.57	0.71	0.63	0.68	0.94	0.80	0.77	0.89	0.80	0.93	0.95

Further to Cronbach's alpha, correlation coefficients were also used to assess internal consistency. This study examined the relationship between the total IIR score and its disclosure components (Ac, N, T, Ci, Fi, Rn, IC, Si, Bi, Cg and Cr) [138] and the results are reported in Table 4.7 (Pearson correlation coefficients).

Table 4.7 shows that the categories are all positively related to each other and that all relationships are statistically significant at the 1% level, except for three at the 5% level, one at the 10% level and one that is not statistically significant.[139] For the convenience of the reader, all coefficients that are statistically significant at the 1% level are printed in **green**, those at the 5% level in **blue**, and those at the 10% level in **red**. Similar results were used by Froidevaux (2004), Cheng *et al.* (2006), and Kelton and Yang (2008) to assess the reliability of their measurement instruments.

Table 4.7: Correlation matrix: measurement instrument categories

Variable	IIR-100	Ac	N	T	Ci	Fi	Rn	IC	Si	Bi	Cg	Cr
IIR-100	1.00											
Ac	0.59	1.00										
N	0.70	0.64	1.00									
T	0.62	0.41	0.48	1.00								
Ci	0.61	0.46	0.46	0.28	1.00							
Fi	0.88	0.47	0.60	0.51	0.36	1.00						
Rn	0.68	0.33	0.56	0.45	0.48	0.56	1.00					
IC	0.67	0.45	0.36	0.50	0.36	0.52	0.40	1.00				
Si	0.80	0.39	0.53	0.50	0.40	0.65	0.58	0.44	1.00			
Bi	0.38	0.21	0.24	0.07	0.29	0.31	0.30	0.25	0.32	1.00		
Cg	0.85	0.42	0.50	0.52	0.48	0.66	0.47	0.56	0.71	0.25	1.00	
Cr	0.79	0.45	0.48	0.38	0.50	0.68	0.37	0.60	0.41	0.29	0.61	1.00

Notes: Green = significant at the 1% level; Blue = significant at the 5% level and Red = significant at the 10% level

[138] Ac refers to the accessibility category, N to the navigation category, T to the timeliness category, Ci to the company information category, Fi to the financial information category, Rn to the relevant news category, Ic to the investment case category, Si to the shareholder information category, Bi to the bondholder information category, Cg to the corporate governance category and Cr to the corporate responsibility category.

[139] All five of these associations relate to the bondholder information category. The bondholder information category measures only five of the total 346 attributes

4.5.2 Validity

As discussed in Section 3.3.6, this study applied construct validity to validate the use of the measurement instrument. If the measurement instrument is to be deemed valid, then it should produce correlations similar to company characteristics found in previous research studies. The Pearson correlation coefficient was used.

Table 4.8 depicts four studies that have used construct validity to validate measurement instruments (all were used to measure corporate website content). The statistically significant positive correlations between the disclosure score and size, leverage, listing status and financing activities, and negative correlation between the disclosure score and ownership structure are all, as expected, consistent with the results of former studies that have used these company characteristics to confirm the validity of their measurement instruments.

Table 4.8: Construct validity: literature versus this dissertation

Study	Significant positive correlation (5%)	Significant negative correlation (5%)	No correlation / Significant at 10% only	This study
Chang *et al.* (2008)	(1) Size (2) Analyst following (3) Institutional ownership (4) Trading volume (5) Share price volatility			Significant positive associations at the 1% level for size, analyst following, trading volume, and share price volatility. Institutional ownership not tested.
Orens *et al.* (2010)	(1) Size (2) Analyst following (3) Media exposure	(4) Ownership structure (dummy variable if one investor has more than 20% shares)	(5) Number of stock exchange listings	Significant positive associations at the 1% level for size and analyst following. Significant positive association at the 5% level for number of listings. Significant negative association at the 5% level for ownership structure. Media exposure not tested.
Trabelsi *et al.* (2008)	(1) Size (2) Performance (3) Future financing activities			Significant positive association at the 1% level for size and at 5% level for past financing activities. Positive, but not significant association for performance (p=0.364).
Froidevaux (2004)	(1) Size (2) Performance (Return on equity)		(3) Market-to-book (4) Beta (5) Leverage	Significant positive associations at the 1% level for size and leverage. Positive, but not significant associations for performance (p=0.364) and market to book (p=0.103). Beta not tested.

4.6 HORIZONTAL ANALYSIS

For the horizontal analysis, individual attribute scores were added, without any weightings as discussed in Chapter 3, in order to calculate one IIR score per company. The maximum IIR that could be achieved was therefore 346 (346 attributes were measured). Figure 4.2 shows the variation in the total IIR score over the 85 companies.

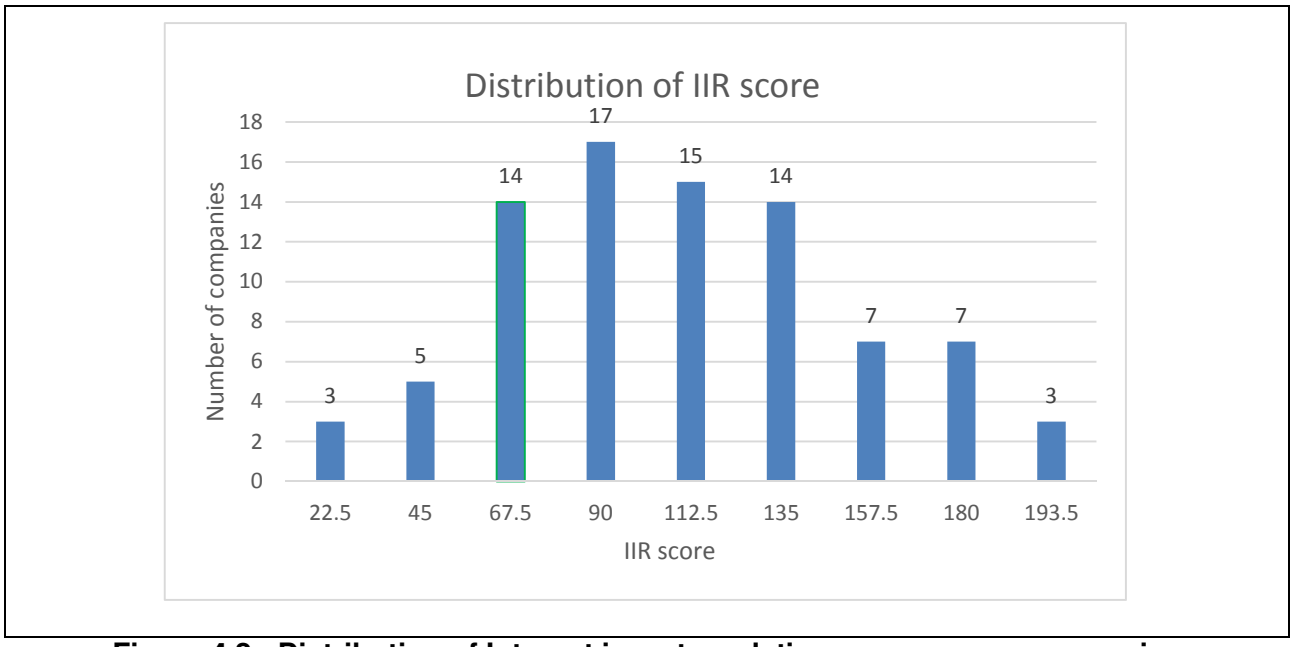

Figure 4.2: Distribution of Internet investor relations scores over companies

The minimum and maximum IIR scores are 13.5 and 193.5 respectively, with 71% of scores falling between 45 and 135, and only three scores in each of the lower and upper categories. The average IIR score is 98 and the median 96. Both the kurtosis (-0.745) and the skewness (0.229) are close to zero. Based on Figure 4.2 and the descriptive statistics above, the IIR scores closely resemble a normal distribution (an assumption that is not needed in further analysis). Table 4.9 presents the average, median, minimum and maximum IIR scores per JSE sector. Four sectors have IIR scores higher than 100 (basic materials, oil and gas, healthcare, and telecommunications), and another four sectors have IIR scores lower than 90 (consumer goods, consumer services, technology, and utilities). Table 4.9 therefore indicates that some JSE sectors may provide more IIR than others.

Table 4.10 presents the average, median, minimum and maximum IIR scores per JSE board listing. Table 4.10 shows that companies listed on the AltX, DCM and VCM on average have lower IIR scores compared to companies listed on the main board.

Table 4.9: Internet investor relations scores per JSE sector

	Number of companies	Average	Median	Minimum	Maximum
Sample	85	97.98	96.00	13.50	193.50
Industrials	19	98.58	82.00	51.50	167.50
Basic materials	17	103.53	101.00	38.50	184.00
Consumer goods	7	88.29	90.50	13.50	193.50
Consumer services	10	87.00	95.25	19.50	155.50
Technology	4	89.00	74.75	71.50	135.00
Oil and gas	1	110.5	110.50	110.50	110.50
Financials	21	97.10	99.50	20.00	184.00
Utilities	1	66.50	66.50	66.50	66.50
Healthcare	3	105.33	120.00	45.50	120.00
Telecommunications	2	159.75	159.75	153.00	166.50

Table 4.10: Internet investor relations scores per JSE board listing

	Number companies	Average	Median	Minimum	Maximum
Sample	85	97.98	96.00	13.50	193.50
Alternative Equity Exchange (AltX)	8	57.38	68.25	13.50	82.00
Development Capital Market (DCM)	1	20	20	20	20
Venture Capital Market (VCM)	1	55.50	55.50	55.50	55.50
Main board	75	103.92	101.00	19.50	193.50

Companies can be categorised according to either their primary stock exchange listing or whether only JSE listed or dually listed. Table 4.11 indicates that companies with either a primary listing on a stock exchange other than the JSE or dual-listed companies have higher IIR scores compared to companies that have a JSE primary listing or are only JSE-listed.

Table 4.11: Internet investor relations scores per listing status

	Number of companies	Average	Median	Minimum	Maximum
Sample	85	97.98	96.00	13.50	193.50
Primary listing – JSE	71	95.20	94.50	13.50	184.00
Primary listing – other	14	112.11	106.75	62.00	193.50
Only JSE-listed	60	90.65	81.50	13.50	167.50
Dual-listed	25	115.58	110.50	38.50	193.50

Table 4.12 shows the minimum and maximum IIR scores per category. In all categories, except accessibility, company information, and shareholder information, at least one company provided

none of the category attributes. In only one category, bondholder information, there was at least one company that provided all the category attributes.

From Figure 4.2 and Tables 4.9 to 4.12, the following is evident: a significant variation exists between the IIR scores of JSE-listed companies and none of the companies examined in this study achieved a 100% IIR score. The next section discusses possible reasons why no company achieved the maximum score.

Table 4.12: Minimum and maximum Internet investor relations scores per category

	Available score	Minimum IIR score	Maximum IIR score	Maximum IIR score %
Sample	346	13.50	193.50	55.92
Accessibility	13	0.50	9.50	73.08
Navigation	14	0.00	12.00	85.71
Timeliness	12	0.00	10.00	83.33
Company information	36	4.00	24.50	68.06
Financial information	65	0.00	48.00	73.85
Relevant news	23	0.00	16.00	69.57
Investment case	26	0.00	16.00	61.54
Shareholder information	60	1.00	36.00	60.00
Bondholder information	5	0.00	5.00	100.00
Corporate governance	50	0.00	35.00	70.00
Corporate responsibility	42	0.00	29.50	70.24

4.6.1 Possible reasons for no company achieving the maximum IIR score

Pirchegger and Wagenhofer (1999: 391) argued that it is not obvious that companies would wish to achieve their maximum disclosure score, nor that users of their corporate websites would want the company to achieve the maximum score. According to Lybaert (2002: 220), companies trade off the benefits and costs of using corporate websites to communicate with investors, with various internal and external factors that can influence a company's decision as to how much to invest in the development of an IIR presence.

Table B1, Annexure B, lists the average and maximum scores as reported by studies that were reviewed during this research into the development of a measurement instrument. The majority of studies in Table B1 have maximum and average scores that are significantly higher compared to the 56% maximum and 28% average reported by this study. It should, however, be noted that most studies listed in Table B1 focused on either developed countries (e.g. US) or only on the largest companies in each country, whereas this study selected a random sample from a population defined also to include the smaller AltX-listed companies.

Further, the studies in Table B1 include on average only 55 attributes compared to the 346 attributes measured in this study as a result of the use of a measurement instrument developed to measure as widely as possible.

However, similar maximum and average results were reported by Froidevaux (2004) (maximum 55% and average 27%), Xiao *et al.* (2004) (maximum 60% and average 31%), Celik *et al.* (2006) (maximum 39% and average 9%), Cormier *et al*. (2009) (maximum 58% and average 25%) and Lai *et al*. (2010) (maximum 50% and average 31%).

Further to the reasons offered by Pirchegger and Wagenhofer (1999) and Lybaert (2002), the following can be offered as possible reasons for the low average of 28% and maximum of only 56% achieved in this study:

i) The measurement instrument used in this study aimed to measure as widely as possible and, as such, various attributes were included in addition to the prescribed best practices, as discussed in Chapter 3. It may be argued that many of these attributes are only 'nice to haves'. For example, the following three accessibility attributes measure alternative formats, excluding similar items also separately measured elsewhere in the instrument:
   - E-reader (dynamic or interactive PDF documents)
   - Excel downloads
   - Webcasts, podcasts or transcripts of presentations

   Some attributes may be deliberately ignored by companies, as they may argue that these attributes are readily available elsewhere (e.g. SENS, share price information, financial highlights) or are already included in their integrated annual report (e.g. shareholder information, company advisors, corporate governance, and corporate responsibility information), and that it is therefore not necessary to duplicate this information on their corporate websites.

   Some attributes, such as the outcomes of meetings, appointment and dismissal of directors, and share trading by directors, measured separately in this study, are also SENS items and companies may therefore argue that these attributes are already accessible via SENS.

ii) Some of the attributes measured in this study may be viewed by companies as alternatives in the development of their corporate website. For example, as navigation tool, companies may choose between a search function, sitemap and help or FAQ option. Companies may argue that if they use one, e.g. search function, it is not necessary to use the others.

   Other examples of alternatives are the use of both an e-mail alert service and RSS content feed to improve the timeliness of information communicated to investors; the provision of alternative types of contact details to investors (i.e. telephone number and e-mail and online form to complete); and the use of more than one social media channel (i.e. Twitter, YouTube, LinkedIn, Facebook, blog, etc.).

iii) Some attributes measured in this study, for example dividend reinvestment plan, ADR[140] programme, information listed debt instruments, analyst reports and JSE SRI[141] may not be applicable to all companies, as some companies simply may not have a dividend reinvestment plan, ADR programme, any listed debt instruments, any analysts following the company or be included in the JSE SRI index. No attempt was made by this study to distinguish between companies with respect to the relevancy or not of such attributes.

iv) Although the utmost care was taken in measuring corporate websites, it is possible that some attributes might have been overlooked, given the complexity (e.g. number of internal hyperlinks) and the variety of website layouts. Similar arguments were used by Lybaert (2001) and Lymer *et al.* (1999).

v) No study reviewed has assessed attributes as being only partially available based on the amount of information, and timeliness and usability concerns. This methodology resulted in lower IIR scores as opposed to assessing attributes as merely available (1) or absent (0).

vi) Lastly, the information environment (i.e. in South Africa) and the sample selected (i.e. a random selection to include all company sizes) could have resulted in lower average and maximum scores compared, for example, to studies in development countries where only the largest listed companies were included in the sample.

Given the fact that 286 or 83% of attributes measured in this study had an average availability of less than 50%, as discussed in Section 4.3 above, it may be argued that if an attribute is only disclosed by, for example, 5% of companies, the attribute is either not applicable to all companies, not required by investors, or deliberately ignored by the company in view of the cost versus benefit in providing the attribute.

Information overload was discussed in Chapter 1 as a possible disadvantage of using corporate websites as communication channel and, as the instrument employed in this study measured 346 attributes, it is debatable whether investors would find all these attributes useful.

To facilitate further analysis and understanding, attributes with average availabilities less than 10%, 20%, 30%, 40% and 50% were removed from the calculation of the IIR score in order to calculate five additional IIR groupings: IIR-90, IIR-80, IIR-70, IIR-60 and IIR-50.

To calculate these alternative groupings, attributes were first sorted in descending order according to the average availability of each. Of the 346 attributes measured, 76 attributes had an average availability of less than 10%. To calculate the first alternative IIR grouping, IIR-90, these 76 attributes were removed from the measurement instrument, resulting in IIR-90 that therefore included only 270 attributes (i.e. 346 – 76). The second alternative IIR grouping, IIR-80, was therefore calculated by

[140] American Depository Receipt
[141] Johannesburg Stock Exchange Socially Responsible Investment index

removing all attributes (i.e. 157) with an average availability of less than 20% from the 346 attributes. IIR-80 was therefore based on the measurement of 189 attributes (i.e. 346 – 157).

Table 4.13 presents descriptive statistics for these five alternative IIR groupings as well as the original IIR score that was based on all 346 attributes (IIR). Table 4.13 shows the number of attributes that were included in each IIR grouping, as well as the average company score per IIR grouping.

Skewness, as measured for the degree of symmetry, and the kurtosis, as measured for the degree of peakedness or flatness, were close to zero for all IIR scores in Table 4.13, which is an indication of a normal distribution. The number of attributes included in the IIR scores decreased from 346 (IIR) to 60 (IIR-50) as a result of the 246 attributes with an average availability of less than 50%.

Table 4.13: Descriptive statistics for alternative Internet investor relations groupings

	Attributes	Average	Min	Q1	Q2	Q3	Max	Standard deviation	Skew-ness	Kur-tosis
IIR	346	97.98	13.50	67.00	96.00	130.50	193.50	43.18	0.23	-0.74
IIR-90	270	93.85	13.50	66.00	92.50	122.50	172.00	39.45	0.09	-0.86
IIR-80	189	82.06	13.50	61.00	82.00	104.50	135.00	30.71	-0.16	-0.82
IIR-70	128	67.23	12.50	53.00	69.00	85.50	101.00	22.01	-0.49	-0.47
IIR-60	95	55.92	12.50	46.50	57.50	69.50	79.00	16.86	-0.67	-0.24
IIR-50	60	39.97	9.50	35.50	42.50	47.00	55.00	10.16	-0.98	0.74

Although the standard deviation decreased from 43.18 (IIR) to 10.16 (IIR-50) indicating decreasing variability, the coefficient of variation was calculated to compare the relative variability of the six data sets depicted in Table 4.13. For ease of comparison, percentages were calculated for the average, Q1, Q2, Q3 and maximum IIR, for these data sets. Table 4.14 shows these percentages and the coefficients of variation.

Table 4.14: Comparison of alternative Internet investor relations groupings

	Attributes	Average (%)	Q1 (%)	Q2 (%)	Q3 (%)	Max (%)	Coefficient of variation (%)
IIR	346	28.32%[142]	19.36%[143]	27.75%	37.72%	55.92%[144]	44.07%[145]
IIR-90	270	34.76%	24.44%	34.26%	45.37%	63.70%	42.04%
IIR-80	189	43.42%	32.28%	43.39%	55.29%	71.43%	37.42%
IIR-70	128	52.52%	41.41%	53.91%	66.80%	78.91%	32.74%
IIR-60	95	58.86%	48.95%	60.53%	73.16%	83.16%	30.15%
IIR-50	60	66.62%	59.17%	70.83%	78.33%	91.67%	25.42%

As depicted in Table 4.14, the coefficient of variation[146] decreased from 44.07% for IIR to 25.42% for IIR-50, confirming the decreasing variability trend. Removing the least available attributes resulted in an increasing average and maximum IIR scores, as could be expected. The IIR-50 average was 66.62% compared to the 28.32% reported if all attributes were included in the score (i.e. IIR). Although still less than 100%, the IIR-50 maximum score was 91.67% compared to the 55.92% measured for IIR.

4.7 ESTERHUYSE AND WINGARD (2016): MEASUREMENT PROCESS AND RESULTS

As discussed in Section 4.2.2, the sample of this study was selected using stratified random sampling. The E&W study, on the other hand, consists of the 188 companies that were listed on 30 June 2002 and remained listed on 1 June 2012, plus another 13 companies that were among the largest 100 companies on 30 December 2011, but not included in the list of 188 companies.

In the E&W study, the assessment of sampled corporate websites took place during 2012. According to the E&W study, the average South African bandwidth was 3.22 Mbps in 2012. According to Mybroadband (2015) the average bandwidth in South Africa was 6.92 Mbps in March 2015, therefore showing a considerable increase since 2012. Throughout the E&W study it was argued that companies in developing countries would only fully utilise the benefits of corporate websites as communication vehicle if bandwidth were increased to acceptable international standards. As a recommendation for further research, E&W (2016) stated that “a follow-up study could also be conducted, as bandwidth increases continuously”.

The E&W study relied primarily on a vertical analysis of its results (i.e. per attribute), while this dissertation discussed research results using both vertical (Section 4.3) and horizontal (i.e. per

[142] 97.98 (IIR average in Table 4.13) / 346
[143] 67 (Q1 in Table 4.13) / 346
[144] 193.50 (IIR max in Table 4.13) / 346
[145] 43.18 (IIR standard deviation in Table 4.13) / 97.98 (IIR average in Table 4.13)
[146] Standard deviation divided by the average.

company) (Section 4.6) analysis. The following similarities and differences between the results reported by the E&W study and this dissertation are noteworthy:

i) The E&W study found an average score of 39.78% compared to the 28% in this study. Besides the reasons for the differences between the E&W study and this dissertation discussed earlier in Section 3.4, two further possible reasons were: (1) the objective of this dissertation was to measure as widely as possible (see Section 3.3.1) and as a result, some of the attributes included in the measurement instrument were only available for a small number of companies (see Figure 4.1); and (2) the distinction made in this study between available, partially available and absent (as discussed in Section 3.3.3; also see discussion in Section 4.6.1) may have resulted into lower scores.

ii) The highest scoring category in the E&W study was “getting to corporate information”. Similarly, the highest score category is this study was navigation (see Table 4.5).

iii) The E&W study listed the top 10 corporate websites (according to their IIR scores) per industry. Six of the 10 companies were from the basic materials industry. An average IIR score of 103.53 was found for the basic materials industry in this study compared to a sample average of 97.98 (see Table 4.9). Four of the 10 IIR corporate websites found in this dissertation were companies listed in the basic materials industry.

4.8 SUMMARY AND CONCLUSIONS

As is evident from the vertical and horizontal analysis in this chapter, significant variation existed in the number of IIR attributes that were provided by companies. Such variation was, however, not unexpected given the absence of standards to regulate what and how information should be provided on corporate websites and the diversity of companies examined in this study. Notwithstanding the fact that the variation in IIR scores was expected – as, to a certain extent, was the low average IIR score – the majority of companies examined did not use corporate websites optimally to communicate with investors. Recommendations are made in Section 9.3 on how companies can improve their IIR.

Companies, however, differ and there may not be one best IIR strategy that works equally well for all companies. Some attributes (e.g. environmental issues) may further be more important for some JSE sectors (e.g. basic materials) than for others (e.g. financial sector). As discussed in the sample selection process in Section 4.2, an important objective was to select a sample that would ensure variation in IIR scores to facilitate statistical analysis in the remainder of this study.

Although the average (28%) and maximum (56%) IIR scores were lower than most of the studies listed in Table B1, Annexure B, this was also not totally unexpected given the country, sample selection procedure, number of attributes, and the measurement conventions followed in this study. Considering the measurement conventions, as discussed in Annexure C, and the challenges inherent in the study, as discussed in Section 4.4 above, IIR scores reported in this chapter were

likely to be an underestimate of the total information that was available to investors from companies. Significant improvements in the average and maximum IIR score were reported following a systematic exclusion of attributes based on their average availabilities (see Table 4.14).

Reasons for not achieving a maximum score were discussed in Section 4.6.1. It should further be noted that each company's unique strategy (e.g. cost versus benefit analysis) is likely to influence what, and how, information is communicated via corporate websites. As discussed in Chapter 1, corporate websites are also only one of various information channels that can be used by companies. As discussed in Chapter 1, this study was restricted to an examination of corporate websites.

IIR scores depended on a number of strategic decisions taken by companies in the past. The first decision was whether to use the corporate website as communication channel to communicate with investors. Almost 90% of the companies that were examined provided a dedicated and descriptive investor relations link on their homepage. This indicates that the majority of companies had therefore either taken the deliberate decision to use the corporate website as investor communication channel or simply believed that it was the right thing to do given common arguments such as: all our competitors are doing it; we have a corporate website, so we might as well add an investor section; or using corporate websites is an inexpensive way to distribute annual reports.

Once companies have elected to include an investor communication channel as part of the corporate website, they need to decide whether to simply reproduce financial reports in a PDF format with no further information, or whether to provide additional information not available in these reports. Almost all companies in the study disclosed PDF annual or integrated annual reports (96%) and interim reports (88%). Although almost all companies also disclosed archived reports, the depth (i.e. the number of years of doing so) varied significantly between companies.

A further decision that companies can take is whether to provide for – and to what extent to provide for – the information needs of smaller investors (e.g. private or retail investors). Most attributes in the shareholder information category (e.g. analyst reports, share prices and dividend information) and the relevant news category relate to the information needs of smaller investors.

In a similar way that stairs in buildings may be problematic to physically disabled people, corporate websites may present barriers to access. Few companies provided information in multiple languages (15%), few used any presentation technologies to improve accessibility for users with a disability (6%), and few provided any specific support for users of mobile devices (15%). Furthermore, few companies provided any transcripts of meetings (only five annual results presentations were recorded), whereas presentation transcripts can be used with relative ease to improve accessibility.

Companies also need to decide whether they should update financial and non-financial information only when annual reports are published, or as the information becomes available. Evidence was found in this study that some companies only update information when annual reports are published,

for instance shareholder analyses and principal shareholders were found to be dated according to the last annual report.

Of the 12 attributes used in this study to measure timeliness, only two attributes had average availabilities of 50% or more. None of the timeliness attributes were included in the top 30 attributes, as listed in Table E1, Annexure E. Further, 147 attributes were assessed as only partially available as a result of being deemed outdated. Of the 44 companies that provided company history, only 15 companies clearly indicated that they had updated their history within the last two years. Just over 50% of companies provided annual results presentations, news updates and share price updates.

CHAPTER 5
DETERMINANTS OF INTERNET INVESTOR RELATIONS

5.1 INTRODUCTION

One of the key findings of this study, as set out in Chapter 4, was the significant variation in Internet investor relations (IIR) scores between companies. This variation was not entirely unexpected, given the unregulated nature of IIR, the results of previous research and the use of the sample selection method in this study. The third objective of the study was to establish the determinants of IIR by means of a regression model linking IIR to selected explanatory variables as identified in the literature. The remainder of this chapter is organised into five distinct sections as follows.

First, a brief overview is given of the various disclosure proxies and research methodologies that were used in prior literature in Section 5.2.[147] The purpose thereof is to set the background against which reported results are interpreted, and compared with previous studies.

As discussed in Chapter 2, various theories were used in the literature to explain disclosure policies followed by companies, namely the agency problem, information problem, signalling theory, investor recognition hypothesis, follower's effect and cost–benefit analysis. Based on these theories, various company-specific characteristics were developed and tested in the literature and can be used to explain disclosure levels.

The second section of this chapter, Section 5.3, discusses these tested company-specific characteristics as independent or explanatory variables to explain disclosure levels. Based on these studies, hypotheses predicting the relationships between the IIR score, as measured and discussed in Chapter 4, and various company characteristics are developed.

Proxies used to measure these independent variables are also discussed in Section 5.3. Similar to Marston and Polei (2004: 297), all financial statement-related information was measured based on the data of the latest annual report.

In Section 5.4, the research methodology followed in this study to test for the determinants of IIR are discussed, including the regression model of choice. Empirical results are discussed in Section 5.5, followed by a chapter summary and conclusion in Section 5.6.

5.2 DISCLOSURE PROXIES AND RESEARCH METHODOLOGIES

Disclosure is generally viewed in the literature as a latent variable (Hassan & Marston, 2010: 32) and as such is not amenable to be observed and measured directly. As discussed in Chapter 3, disclosure studies can be categorised as indirect disclosure proxy studies that are based on a proxy without examining the disclosure vehicle and direct disclosure proxy studies that are based on an

[147] For a comprehensive discussion, see Chapter 3.

examination of the original disclosure vehicle (i.e. content analysis). Direct disclosure proxy studies can further be categorised into studies that have examined corporate websites as disclosure vehicles as opposed to studies that have examined annual reports as disclosure vehicles.

For the purpose of this study, disclosure studies were further categorised into descriptive, determinant and effect studies. Table B1, Annexure B, summarises the literature according to:

- The country where the study was performed (i.e. data used);
- The sample selection criteria used (e.g. random sample or largest companies);
- The number of attributes measured, as well as a further distinction between presentation and content attributes;
- The maximum disclosure score that was achieved by a company in the study;
- The average disclosure score that was achieved by the companies in the study;
- Whether weights were assigned in the study or not;
- Whether the study distinguished between the quantity as opposed to the quality of disclosure;
- Whether reliability tests to ensure the reliability of the measurement instrument used were specifically discussed; and
- Whether validity tests to ensure the validity of the measurement instrument used were specifically discussed in the study.

All studies listed in Table B1 examined corporate websites as disclosure vehicles.

As specifically discussed in Section 3.2.6 in Chapter 3, direct disclosure proxy studies that are based on an examination of corporate websites further differ regarding the document types (e.g. PDF and HTML) that were examined or not examined, as well as website sections examined or not examined. Further, some studies include only specific industries compared to other studies that have purposefully excluded specific industries (e.g. the financial industry).

Studies can also be categorised based on the country where the study was performed, e.g. developed versus developing countries. However, even within developed countries mixed results were reported, for example Allym and Lymer (2003: 191) reported no significant association between size and disclosure for US, UK, Canada and Hong Kong, compared to a significant association for Australia.

Pervan (2006: 22) used the same measurement of voluntary financial Internet reporting for Croatian and Slovene listed companies and reported different significant independent variables in predicting disclosure as dependent variable between the two countries. According to Bollen *et al.* (2006: 280) previous research showed that disclosure practices may differ between countries for a number of reasons, e.g. cultural differences, role of equity markets, and legal factors.

Debreceny *et al.* (2002: 382) used six categories to classify countries. The categories (sorted in ascending disclosure levels) are: (1) Emerging (Malaysia, Mexico, Brazil and Chile), (2) Latin (Italy

and Spain), (3) Franco-German-Japanese (France, Germany, Japan, Netherlands and South Korea), (4) Asian-Colonial (Hong Kong, Singapore and South Africa), (5) Nordic (Sweden, Denmark and Norway) and (6) Anglo-American countries (Australia, Canada, New Zealand, US and UK).

In a similar vein, Bollen *et al.* (2006: 285) used three categories. The categories (also sorted in ascending disclosure levels) are: (1) Continental (Belgium and France), (2) Asian-Colonial (South Africa) and (3) Anglo-American countries (Australia, Netherlands and UK).

Ahmed and Courtis (1999) listed sampling error, different attributes, different definitions of explanatory or independent variables, and different research settings as possible explanations for mixed results in the literature.

As discussed in the next section of this chapter, prior studies further differ regarding how independent variables were measured, as well as regarding their respective hypothesised relationships between disclosure and these independent variables.

5.3 PRIOR THEORETICAL DIRECTIONS OF RELATIONSHIPS AND MEASUREMENT

Table 5.1 shows the different proxies that were used in the literature for each of the independent variables discussed below. This section discusses ten variables that were tested in previous studies as independent or explanatory variables to explain variations in disclosure levels. More specifically, this sections discusses: (1) the underlying reasons used by the literature to hypothesise the direction of relationships, (2) the results found in the literature in terms of statistical significance and the economic sense of directions, (3) the direction hypothesised in this dissertation and finally, (4) a brief discussion of how each of these variables were measured in this dissertation.

Table 5.1: Proxies used in the literature to measure the determinants of disclosure

Variable	Proxy used: Study
SIZE	Earnings: Pervan (2006) Turnover: Larrán and Giner (2002) Market capitalisation: Larrán and Giner (2002); Xiao *et al.* (2004): Bollen *et al.* (2006); Orens *et al.* (2010); Ettredge *et al.* (2002) and Pervan (2006) Number of employees: Orens *et al.* (2010) and Larrán and Giner (2002) Total assets: Larrán and Giner (2002); Abdelsalam *et al.* (2007); Orens *et al.* (2010); Trabelsi *et al.* (2008); Cormier *et al.* (2009) and Pervan (2006)
LEVERAGE	Book value of debt/Market capitalisation: Froidevaux (2004) Debt/assets: Orens *et al.* (2004); Aly *et al.* (2010) and Xiao *et al.* (2004) Debt/equity: Cormier *et al.* (2009); Larrán and Giner (2002) and Bollen *et al.* (2006)

Table 5.1: Proxies used in the literature to measure the determinants of disclosure (continued)

Variable	Proxy used: Study
FINANCIAL PERFORMANCE	Return on equity: Larrán and Giner (2002); Pervan (2006); Aly *et al.* (2010); Bollen *et al.* (2006); Froidevaux (2004) and Marston and Polei (2004) Return on assets: Abdelsalam *et al.* (2007); Pervan (2006); Cormier *et al.* (2009) and Ettredge *et al.* (2002) Rank transformed return on assets: Xiao *et al.* (2004) Return on sales: Pervan (2006) Dummy variable of one if profit increased year to year: Trabelsi *et al.* (2008) EPS growth: Orens *et al.* (2004) Annual share return: Ettredge *et al.* (2002) and Bollen *et al.* (2006)
FINANCING ACTIVITIES	Dummy variable of one if any new equity was issued: Trabelsi *et al.* (2008); Xiao *et al.* (2004) and Ettredge *et al.* (2002) Dummy variable of one if year-to-year change of more than 20% in debt to market value of equity ratio: Cormier *et al.* (2009)
BIG FOUR AUDIT	Dummy variable of one if audited by one of big 4 audit firms: Bonsón and Escobar (2006); Xiao *et al.* (2004); Trabelsi *et al.* (2008) and Aly *et al.* (2010)
INDUSTRY	Dummy variable of one if company is in manufacturing industry: Abdelsalam *et al.* (2007) Three dichotomous variables for primary, secondary and tertiary (services) industries: Larrán and Giner (2002) Ten dichotomous variables for 10 industries: Bonsón and Escobar (2006) All companies assigned to one of two industries, (1) production and retail (2) services and telecommunications: Geerings *et al.* (2003) Dummy variable of one for companies in the services or telecommunications industry: Bollen *et al.* (2006) Dummy variable of one for high technology industry based on ISE classification: Celik *et al.* (2006) Dummy variable of one for companies in the IT industry: Xiao *et al.* (2004)
LISTING STATUS	Weight of one and a half (1.5) for all US and LSE listings and one for all other listings: Orens *et al.* (2010) Dummy variable of one if listed on at least one foreign stock exchange: Larrán and Giner (2002); Marston and Polei (2004); Trabelsi *et al.* (2008) and Bollen *et al.* (2006) Dummy variable of one for SEC registration (i.e. US stock exchange listing): Cormier *et al.* (2009)
OWNERSHIP – CONCENTRATION	Dummy variable of one if single investor has more 20% shareholding: Orens *et al.* (2010) and Cormier *et al.* (2009) Percentage of shares held by executives and major shareholders (major = more 10% shares): Trabelsi *et al.* (2008) Percentage of shares held by major shareholders (major = more 5% shares): Abdelsalam *et al.* (2007) Percentage of shares held by directors: Abdelsalam *et al.* (2007)
OWNERSHIP – DISPERSION	Free float: Celik *et al.* (2006) and Marston and Polei (2004) Percentage shares available to individual investors: Bollen *et al.* (2006) Number of shareholders: Pervan (2006)

5.3.1 Company size (SIZE) (H1)

According to Celik *et al.* (2006: 107), company size was the most widely used variable in the literature to explain disclosure levels. Various reasons are offered in the literature for a positive association between disclosure and size.

- Information asymmetry and agency costs
  Celik *et al.* (2006: 108) argued that large companies have higher information asymmetry between managers and shareholders, resulting in higher agency costs that motivate larger companies to disclose more information than smaller companies. In a similar vein, Marston and Polei (2004: 293) argued that larger companies are more complex and more information disclosure is therefore necessary to allow investors to make efficient investment decisions.

- Political cost hypothesis
  The political cost hypothesis predicts that larger companies have a stronger motivation to improve corporate reputation and public image, as they are more publicly visible (Celik *et al.* 2010: 108) and attract the attention of government bodies (Debrency *et al.* 2002). Watts and Zimmermann (1978: 115) agreed that larger companies face higher political costs.

- Economies of scale
  Marston and Polei (2004: 294), Bollen *et al.* (2006: 281), Trabelsi *et al.* (2008), Ashbaugh *et al.* (1999) and Oyelere *et al.* (2003) all argued that larger companies are expected to disclose more information given the assumption that the relative costs of information production are lower for larger companies than for smaller ones.

- Availability of information to disclose
  Aly *et al.* (2010: 185) argued that larger companies tend to disclose more information as they simply have more to disclose compared to smaller companies. For example, larger companies usually have more products and more complex distribution networks, which require more complex management information systems and databases for management control purposes.

- Internationalisation
  Larger companies are expected to be more active in an international context (e.g. foreign listing or foreign revenue) and as such are potentially exposed to a wider variety of shareholders, customers and jurisdictions, each of which may impose additional information requirements.

With a few exceptions almost all studies show a significant positive relationship between size and disclosure (both printed media and corporate websites). Pirchegger and Wagenhofer (1999), for example, found no association between corporate website disclosure and size for a German-listed

sub-sample. Allym and Lymer (2003: 191) measured and tested for an association between size and internet financial reporting in five countries, but only found a significant association in Australia.[148]

Table 5.1 shows that a wide variety of size proxies have been used in previous studies. Given the diversity of companies included in the study sample (e.g. the number of employees) and the availability of alternative accounting policies (e.g. to measure total assets), this study uses market capitalisation as proxy for size. The daily market capitalisation of each company's ordinary shares was captured from the INET BFA database (product called Market Data) for all trading days from 1 December 2014 to 30 November 2015.

The average market capitalisation for each company was then calculated over these trading days to smooth the effect of short-term market movements. For five companies daily market capitalisation was only captured as available, as their JSE listings were suspended[149] or delisted[150] during this period.

A positive association between IIR level and market capitalisation was expected (H1).

5.3.2 Leverage (LEV) (H2)

Agency theory is often used in the literature as underlying theoretical foundation to hypothesise a positive association between disclosure and leverage. Debreceny *et al.* (2002) argued that an increase in the debt-equity ratio creates agency costs and, according to Aly *et al.* (2010: 186), companies could voluntarily disclose information on corporate websites to allow creditors constantly to monitor the company in assessing the ability of the company to repay its debts.

Xiao *et al.* (2004: 209) noted that as the risk of default increases with leverage, lenders and shareholders would demand more information to assess the company's health. Larrán and Giner (2002: 66) argued that by increasing disclosure levels, a company can reduce agency costs and the possible conflicts between shareholders and creditors.

On the other hand, signalling theory was used by Cormier *et al.* (2009) to argue that companies in a poor financial condition may be unable to withstand the initial negative consequences associated with additional disclosures and might therefore opt to disclose less. Cormier *et al.* (2009) reported a significant negative association between disclosure and leverage, but only at the 10% level, and no significant associations were reported for two of the three categories used to organise attributes, namely business-related and socially related categories.

It should be noted that the measurement instrument used by Cormier *et al.* (2009) measured only performance disclosure attributes that are based on balance scorecard literature, and that they included only eight presentation-related attributes, and no relevant news or shareholder information

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[148] No significant associations were found in the US, UK, Canada or Hong Kong.
[149] Evraz Highveld Steel & Vanadium Ltd, Firestone Energy Ltd and IPSA Group Plc.
[150] Fountainhead Property Trust and Infrasors Holdings Ltd.

attributes. Cormier *et al.* (2009) based their study on a Canadian sample, including only the largest listed non-financial companies.

Although Bollen *et al.* (2006: 279) contended that, if debtholders are primarily informed via alternative communication channels (i.e. alternative to corporate websites), the association between leverage may be negative in cases where an increased level of debt results in the reduced importance of equity holders. They hypothesised that the quality of investor relations websites is not affected by leverage. Bollen *et al.* (2006: 292) accordingly reported no significant association.

Research to date reports positive; negative; and no association between disclosure and leverage.

Xiao *et al.* (2004: 215), Celik *et al.* (2006), and Ismail (2002) all reported a positive association. As discussed above, Cormier *et al.* (2009: 8) reported a negative association. The following studies however reported no significant association: Aly *et al.* (2010: 191), Bollen *et al.* (2006: 291), Debreceny *et al.* (2002), Froidevaux (2004), Almilia (2009: 95), Larrán and Giner (2002), and Oyelere *et al.* (2003).

As Table 5.1 shows, a wide variety of leverage proxies have been used in previous studies. This study used the debt to asset ratio as proxy for leverage. The debt to asset ratio was captured from the INET BFA database (product called Ratios-General).

The ratio is a measure of a company's financial leverage and if the ratio is greater than 0.5, the majority of assets are financed through debt. If smaller than 0.5, assets are primarily financed through equity. INET BFA calculates the debt to asset ratio using the following ratio:

$$\frac{Total\ debt}{Total\ assets} \tag{5.1}$$

A positive association between IIR level and the debt to asset ratio was expected (H2).

5.3.3 Current ratio (CUR) (H3)

Leverage and the current ratio are both risk measures, but where increased leverage is associated with increased risk, an increased current ratio is associated with decreased risk.

As with leverage, underlying theories are however somewhat conflicting, with signalling theory predicting a positive association and agency theory a negative one between disclosure and the current ratio. Signalling theory suggests that more liquid companies will disclose more to distinguish themselves from less liquid companies, but agency theory on the other hand proposes that less liquid companies may disclose more information to satisfy the information needs of shareholders and creditors (Aly *et al.* 2010: 186).

Oyelere *et al.* (2003) found a positive association, while Aly *et al.* (2010: 186), and Leventis and Weetman (2004: 240) found no significant association.

Following Aly *et al.* (2010), this study measured the current ratio as the ratio between current assets and current liabilities. The current ratio was captured from the INET BFA database (product called Ratios-General). A negative association between IIR level and the current ratio was expected (H3).

5.3.4 Financial performance (ROE) (H4)

Signalling theory can be used to hypothesise a positive association between disclosure and financial performance. Companies with good news are more likely to disclose more information compared to companies with bad news (Aly *et al.,* 2010: 185). Profitable companies have an incentive to distinguish themselves from less successful companies in order to raise capital at the lowest possible price (Marston & Polei, 2004: 294). Lev and Penman (1990: 49) and Ettredge *et al.* (2002) pointed out that the absence of voluntary disclosure may be perceived as "bad news" about a company. Larrán and Giner (2002: 66) argued that increased disclosure associated with profitability could be seen as a mechanism to improve the image of the company, to secure directors' job security and to improve their remuneration.

On the other hand, Bollen *et al.* (2006: 279) argued that profitable companies may be concerned about maintaining their competitive advantage and therefore may deliberately not use all disclosure options available in order to protect their position. As almost all information measured in this study was also available via other sources and the only category that measured strategic information was the investment case category, this dissertation asserts that this argument as used by Bollen *et al*. (2006) is not applicable to this study. Bollen *et al.* (2006) hypothesised that the quality of IIR is not affected by company performance and also reported results that show no significant association.

Celik *et al*. (2006: 110), Aly *et al.* (2010: 185) and Trabelsi *et al.* (2008) pointed to the mixed results reported in the literature and listed research that found both positive and negative associations. Positive associations were reported by Froidevaux (2004), Celik *et al.* (2006), Aly *et al.* (2010) and Pirchegger and Wagenhofer (1999) (Austrian sample).

On the other hand, Ashbaugh *et al.* (1999: 250), Ettredge *et al.* (2002: 366), Marston and Polei (2004), Oyelere *et al.* (2003), Pirchegger and Wagenhofer (1999) (German sample), Xiao *et al.* (2004: 215), Larrán and Giner (2002), Abdelsalam *et al.* (2007), Bollen *et al.* (2006: 291), Cormier *et al.* (2009) and Leventis and Weetman (2004) all document no significant association between financial performance and disclosure.

Performance proxies used in the literature can be categorised as either accounting-based or performance-based. Accounting-based performance measures are based on information that was reported in the financial statements of the company (e.g. return on equity) compared to market-based performance measures that are based on share price performance (e.g. annual share return). In addition to the various performance proxies (see Table 5.1) that were used and reasons as discussed in Section 5.2 above, a possible non-linear relationship (Ismail, 2002) and the

manipulation of earnings (Orens *et al*., 2010) can be offered as two further possible reasons for conflicting results.

Ismail (2002: 17-18) reported a positive association between profitability and Internet disclosure, but only within a specific profitability range. Beyond this range, a negative association was reported. It is more difficult to analyse firms with negative earnings than those with positive earnings (Brown, 2001) as the former tend to manipulate their earnings to a larger extent than the latter (Orens *et al.,* 2010: 1070).

As none of the studies reviewed for this dissertation showed any significant association between disclosure and a market-based performance measure, this study did not include a market-based performance measure as performance proxy.[151] This study used return on equity (ROE) as performance proxy. The return on equity (ROE) ratio was captured from the INET BFA database (product called Ratios-General). INET BFA calculates ROE as follows:

$$\frac{Profit\ attributable\ to\ ordinary\ shareholders}{Ordinary\ shareholders\ interest} \tag{5.2}$$

A positive association between IIR level and ROE was expected (H4).

5.3.5 Market to book (MTB) (H5)

Market to book (MTB) is a financial ratio that compares the market's valuation of a company to the book value of the company as reflected in its financial statements. According to INET BFA, a high ratio is caused either by the market being willing to pay a premium or by companies (e.g. in the technology sector) that have intangible or other hidden assets that are not reflected in the financial statements and therefore are not reflected in the book value per share.

Myers (1977) and Ohlson (1995) reason that growth perspectives and intangibles are intertwined and could be (broadly) represented by the difference between the market value and the book value of a company. Celik *et al.* (2006: 110) argued that companies with high growth prospects and intangibles have specific knowledge that is not effectively and efficiently transferable to investors through conventional accounting disclosures.

In a similar vein, Trabelsi *et al.* (2008) argued that companies where a large percentage of value is represented by intangibles may be more likely to disclose additional information. These authors argued that as company value is relatively more difficult to assess based on available accounting information (i.e. book value), more information is disclosed. Larrán and Giner (2002: 67) argued that as higher market-to-book ratios are associated with higher amounts of intangibles not recorded in the financial statements of companies there will be greater motivation for such companies to disclose more information to ensure that the company is properly valued.

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[151] Bollen *et al.* (2006) and Ettredge *et al.* (2002) tested, but found no significant association.

Bollen *et al.* (2006: 280), on the other hand, hypothesised that the quality of IIR is not related to the growth rate of a company as measured by the market-to-book value ratio for the following reasons. Firstly, fast-growing companies may choose to disclose less since disclosure of information may result in the loss of competitive advantage. Secondly, given the need to devote considerable funds and time to manage their high growth rates, fast-growing companies may lack the financial or human resources to optimise IIR.

As also discussed above in Section 5.3.4, almost all information measured in this study is also available via other sources. The first argument is therefore rejected in this dissertation. Although the second argument may be valid, this dissertation argues that, given the cost–benefit trade-off principle as discussed in Section 2.2.6, even companies with high growth rates and fewer available resources will still disclose more information if the benefits outweigh the costs thereof.

Significant positive associations were reported by Cormier *et al.* (2009), Orens *et al.* (2010) and Slovene (2006), as opposed to Bollen *et al.* (2006: 291) and Abdelsalam *et al.* (2007: 24)[152] who reported significant negative associations.

Froidevaux (2004), Celik *et al.* (2006), Trabelsi *et al.* (2008) and Larrán and Giner (2002), on the other hand, all reported no significant association between the market-to-book ratio and disclosure levels.

The market-to-book value ratio was captured from the INET BFA database (product called Ratios-General). INET BFA calculates the market-to-book value as a share's market value divided by its book value. Book value per share is calculated as the ordinary shareholders' interest divided by the number of ordinary shares in issue.

A positive association between IIR level and the market-to-book value ratio was expected (H5).

5.3.6 Financing activities (NET.ISS and NET.BB) (H6 and H7)

Cormier *et al.* (2009: 8) argued that companies that access capital markets on a continuous basis have more pressure to disclose more regularly, as investors and lenders dislike any unpleasant surprises. Cormier *et al.* (2009: 16) documented a highly positive association at the 1% level between their measure of capital market reliance[153] and web-based performance disclosure.

Trabelsi *et al.* (2008) also reported a significant positive association (although only at the 10% level) between their measure of financing activities[154] and incremental[155] voluntary website disclosure. Xiao *et al.* (2004), on the other hand, reported no significant association between their proxy for financing

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[152] At the 10% level between two sub-sections of their total disclosure score, general content and usability, and the market-to-book ratio.
[153] Dummy variable of one for year-to-year change of more than 20% in the debt to market value equity ratio.
[154] Dummy variable of one if any new debt/equity has been issued in the prior three years.
[155] Incremental disclosure was defined as disclosure additional to SEDAR (i.e. mandatory) disclosure requirements.

activities and the total disclosure score, and a not expected, significant negative association at the 5% level for a voluntary disclosure sub-category.

In this study, a dummy variable of one was assigned if the company on net[156] issued shares during 2015. In a similar vein, a dummy variable of one was assigned if the company on net bought back shares during 2015. The total number of shares as at 31 December 2014 and 31 December 2015 were captured from the INET BFA database (product called market data) to ascertain whether the company on net issued (i.e. increase in shares) or bought back (i.e. decrease in shares).

A positive association between the IIR level and a net issue of shares was expected (H6), as opposed to a negative association between IIR level and a net buy back of shares (H7).

5.3.7 Big four audit (AUDIT) (H8)

Xiao *et al.* (2004: 200) as well as Wang, O and Claiborne (2008: 18) argued that both agency and signalling theory support the hypothesis that increased levels of IIR are expected for companies that are audited by one of the big four audit companies. Larger audit companies have more to lose from damage to their reputations and are therefore likely to call for more extensive disclosures. The auditing function may help to reduce the interest conflicts between management and shareholders.

Knowing that larger auditing companies usually demand more detailed disclosure, the engagement of a big four auditor is a signal to shareholders and the investment community of their acceptance of such demands. Xiao *et al.* (2004: 201) proposed that international audit companies are more likely to facilitate the use of innovative practices, such as Internet reporting, and are therefore more likely to facilitate the use of innovative IIR practices. Xiao *et al.* (2004: 215) reported a positive associate between audit quality and the level of voluntary disclosure via corporate websites, but no significant associations between the total disclosure score, content, presentation or mandatory scores.

Aly *et al.* (2010: 187) cited research that reported, respectively, positive and no association between disclosure and being audited by a big four audit company.

A dummy variable of one was assigned in this dissertation for companies that were audited by a big four audit company. The audit company was captured from the audit report in the latest financial statements. The following four companies were taken as being one of the big four audit companies: Deloitte & Touche, Ernst & Young, KPMG[157] and PwC[158].

A positive association between the IIR level and being audited by a big four audit company was expected (H8).

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[156] It is recognised that some companies may have issued and bought back shares during the measurement period. No distinction was made between share issues and share buy backs. For the purpose of this study, a net issue is defined as an increase in shares. In a similar vein, a net buy back of shares is defined as a decrease in shares.
[157] Klynveld Peat Marwick Goerdeler (KPMG)
[158] PricewaterhouseCoopers (PwC)

5.3.8 Industry (IND.JSE) (H9)

Aly *et al.* (2010: 187) used signalling theory to explain an association between industry type and disclosure. If a company within an industry discloses less information compared to industry peers it may be interpreted as a signal that the company is hiding bad news. This trend of companies to disclose similar information as industry peers is often referred to in the literature as the 'follower's effect' (e.g. Lybaert, 2002).

Celik *et al.* (2006: 107) cited and briefly discussed the following studies that all report an association between industry type and level of disclosure: Cooke (1992); Mitchell, Chia and Loh (1995); Botosan (1997); Sengupta (1998), and Ferguson, Lam and Lee (2002). These studies, however, all measured disclosure as available via the printed media, e.g. the annual report.

Studies that have used corporate websites as disclosure vehicles for measurement purposes showed conflicting results. Abdelsalam *et al.* (2007), Pervan (2006), Lybaert (2002), Celik *et al.* (2006), Aly *et al.* (2010), Bonsón and Escobar (2002; 2006), Ettredge *et al.* (2001) and Xiao *et al.* (2004: 202) all reported an association as opposed to Trabelsi *et al.* (2008), Larrán and Gilner (2002), Geerings *et al.* (2003), Oyelere *et al.* (2003) and Bollen *et al.* (2006), who reported no significant association.

According to Abdelsalam *et al.* (2007: 14), the type of industry and direction of association was uncertain and appeared to be driven by country-specific variables. Aly *et al.* (2010: 187) argued that the different industry classifications used in prior research could possibly explain conflicting results, for example: Celik *et al.* (2006: 107) categorised all companies listed on the ISE[159] into one of three industries: manufacturing, finance and service, as compared to Aly *et al.* (2010: 190) who categorised 62 companies into nine different industries. Pervan (2006: 17) categorised 55 Croatian and 30 Slovene listed companies into seven industries. In support of Abdelsalam *et al.* (2007), Pervan (2006) found significant associations for the tourism and shipping industries in their Croatian sub-sample, but in their Slovene sample they found associations only for the transport industry. Bonsón and Escobar (2006: 305) categorised their sample into 10 industries, but only found a significant association between one industry (financial) and internet disclosure.

According to Xiao *et al.* (2004: 202), information technology (IT) companies were more likely to optimise IIR for three reasons: (1) IT is their area of expertise, (2) it provides an incentive to demonstrate that they are technology leaders, and (3) companies tend to imitate early adopters within the same group according to the fad perspective.[160]

As Table 5.1 shows, a wide variety of industry proxies have been used in previous studies. For the purpose of this study, companies were dichotomised based on their JSE industry membership. As

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[159] Istanbul Stock Exchange (ISE)

[160] Abrahamson (1991: 597) described the 'fad' perspective as the tendency of companies to follow early adopters in the industry as a result of uncertainty.

discussed in Chapter 1, the sample selection process that was followed in this study entailed that the defined population was first stratified according to their JSE industry membership before a random sample was selected.

As Table 4.3 in Chapter 4 shows, all sample companies could be categorised in one of 10 JSE industries. To avoid the dummy variable trap,[161] dummy variables were only created for nine of the 10 JSE industries.

JSE industry classification was captured from a spreadsheet received directly from a JSE representative. An association (positive or negative) is expected between the IIR level and the JSE industry classification (H9).

5.3.9 Listing status (LIST.D, LIST.P and LIST.Y) (H10, H11 and H12)

According to Xiao *et al.* (2004: 201) and Kang and Stulz (1997), foreign shareholders are more likely to face higher levels of information asymmetry. A foreign listing will extend the dispersion of shareholders and therefore increase information asymmetry (Bollen *et al.,* 2006: 278). Marston and Polei (2004: 295) and Debreceny *et al*. (2002) argued that higher disclosure levels can decrease these information asymmetries. Extensive voluntary disclosure via corporate websites can also create the impression of greater transparency (Xiao *et al.,* 2004: 201), which may be important for foreign investors.

On another point, Cooke (1992: 232) argued that companies with listings on a foreign stock exchange face additional disclosure requirements and would therefore disclose more information than companies not subject to these additional requirements. In a similar vein, Xiao *et al.* (2004: 201) used the forced selection perspective[162] to motivate why more extensive disclosures are expected from companies with foreign listings. Bollen *et al.* (2006: 278) emphasised that for companies to communicate with local and foreign stakeholders (e.g. customers, consumers, corporate partners or investors) a communication channel, such as the corporate website that can simultaneously provide identical information to all interested stakeholders, is needed.

Lang, Lins and Miller (2003: 318) listed three possible reasons why companies listed in the US will disclose more information compared to companies not listed in the US: (1) increased regulation by the Securities and Exchange Commission (SEC), (2) a more demanding litigation environment, and (3) enhanced disclosure and reconciliation to US GAAP.

Research by Murphy, Poist, Lynagh and Grazer (2003: 248) suggested a positive association between the use of the Internet to generate corporate revenue at a global level and the development of corporate websites.

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[161] As discussed in Chapter 7 of the textbook 'Principles of Econometrics' (Hill *et al*., 2011)

[162] According to the forced selection perspective, a company is pressured by powerful external organisations (e.g. government or providers of capital) to adopt an innovation (e.g. IIR) irrespective of any benefits to the company.

A number of studies to date have documented an association between disclosure (as measured via printed media, e.g. hard copy annual reports) and the number of listings or a listing on a US or UK stock exchange (Celik *et al.,* 2006: 109). A positive association between Internet reporting and listing status was reported by Xiao *et al*. (2004), Debreceny *et al.* (2002), Bollen *et al.* (2006: 291) and Aly *et al.* (2010: 191). Oyelere *et al.* (2003) found no association between Internet reporting and listing status. Ali (2010), as cited by Khan and Ismail (2012: 7), documented a positive association between listing age and Internet financial reporting.

As Table 5.1 shows, a wide variety of proxies have been used in previous studies. This study uses three alternative proxies for listing status. The first two dichotomise companies based on whether they are dually listed or not and the stock exchange where they are primarily listed. A dummy variable of one was assigned to companies with a dual stock exchange listing (H10) and a dummy variable of one was assigned to companies with a primary listing other than the JSE (i.e. only having a secondary JSE listing) (H11). The third proxy is a measure of the listing age (i.e. number of years listed) of the company as on the date that the IIR of the company was measured (H12).

The data requirements for all three proxies were captured from a spreadsheet received directly from a JSE representative. Positive associations between the IIR level and all three listing status proxies (i.e. LIST.D (H10), LIST.P (H11) and LIST.Y (H12)) were expected.

5.3.10 Ownership (DIR.SH, F.FLT and 20%.SH) (H13, H14 and H15)

Investors with smaller shareholding percentages have less access to information compared to investors with large shareholdings that may obtain information more easily from internal sources within the company. According to Marston and Polei (2004: 294), it could therefore be assumed that investors with smaller shareholdings will use corporate websites to gather company-specific information as other information sources may be more inaccessible than they are for the larger shareholders.

Trabelsi *et al.* (2008) state that the decision to disclose information via corporate websites depends to an extent on whether managers have incentives to provide all users (including small investors) with equal and immediate access to information, therefore facilitating a 'clientele effect' scenario. Ettredge *et al.* (1999) reported results that suggest that information disclosed on corporate websites varies systematically with the relative sophistication of the user base, where higher levels of retail ownership[163] are associated with relatively subjective and more abbreviated information.

According to Ho and Wong (2001: 144) and Marston and Polei (2004: 294), agency theory dictated that in a dispersed ownership shareholder structure, companies will disclose more information to reduce agency cost and information asymmetry. As Table 5.1 shows, a wide variety of ownership proxies have been used in previous studies. Proxies such as the number of shareholders (e.g.

[163] The number of investors was used as proxy for the level of retail ownership.

Pervan, 2006) and free float percentage (e.g. Celik *et al.,* 2006) could be used to proxy for ownership dispersion. The free float percentage is calculated with the following formula:

$$\frac{(Total\ issued\ shares - Restricted\ shares)}{Total\ issued\ shares} \quad (5.3)$$

Restricted shares (i.e. 'locked in shares' or shares not readily available for trade) are defined by the JSE ground rules document (JSE, 2016b) and include shareholdings such as shares held by the government; shares held by directors, senior executives and managers; employee share schemes; and shares held by public companies.

Based on agency theory, positive associations for the number of shareholders and the free float percentage, both as measures of shareholder dispersion, could therefore be expected.

Some studies, however, developed a proxy to measure the opposite of shareholder dispersion, i.e. shareholder concentration. Orens *et al*. (2010) measured shareholder concentration as a dummy variable of one if companies had a single investor that had a 20% or more shareholding. Abdelsalam *et al.* (2007) used two proxies to measure shareholder concentration, namely the percentage of shares held by directors and the percentage of shares held by major shareholders.[164] Based on agency theory, negative associations for such proxies (i.e. shareholder concentration) could be expected.

Directors who are also shareholders will have to bear both the consequences and benefits of the quality of management. Abdelsalam *et al.* (2007: 9) argued that high levels of director shareholdings align the interest of management and shareholders, which, in turn, reduces the need for additional voluntary disclosure to reduce agency costs.

According to Chau and Gray (2002: 249) family-controlled companies have less motivation than companies that have wider ownership to disclose more information, given their relative weak demand for public disclosure. Trabelsi *et al*. (2008) argued that companies with a concentrated ownership may want to preserve that information advantage by not using disclosure channels such as corporate websites.

Two other proxies that could be used as ownership proxy are foreign ownership and institutional ownership. A larger percentage of foreign ownership could also be expected to result in increased disclosure levels – for the same reasons that a foreign listing is expected to result in increased disclosure levels (see discussion of listing status in Section 5.3.9). Xiao *et al.* (2004) argued that as institutional owners have more resources and expertise to monitor listed companies than individual investors, one could expect an association between increased disclosure and increased institutional ownership. Bushee and Miller (2007) identify institutional ownership as a trait of companies that have implemented a successful investor relations programme. Chang *et al*. (2008) found a significant

[164] Abdelsalam *et al.* (2007) defined major shareholders as all shareholders with a shareholding exceeding 5%.

positive association between institutional ownership and the measure of investor relations disclosure quality.

Literature measuring disclosure using the printed media as disclosure vehicle reports conflicting results. For example, Chau and Gray (2002: 257) found a positive association between ownership dispersion and voluntary disclosure compared to Raffournier (1995: 273-274), who reported a non-significant relationship.

More specifically in regard to studies that measured corporate websites as disclosure vehicle, Orens *et al.* (2010) and Abdelsalam *et al.* (2007) reported significant negative associations between disclosure and ownership concentration, but Trabelsi *et al.* (2008) and Cormier *et al.* (2009) reported no similar significant associations.

Regarding the association between disclosure and ownership dispersion, Bollen *et al.* (2006) reported a significant positive association from their univariate analysis, but reported no significant association following a multivariate analysis. Marston and Polei (2004) found a significant positive association for their 2000 sub-sample, but no significant association for their 2003 sub-sample from their multivariate analysis. Pervan (2006) reported a significant positive association for a Croatian sub-sample, but no significant association for a Slovene sub-sample.

This study uses three alternative proxies for ownership, two for ownership concentration and one for ownership dispersion.

A dummy variable of one was assigned for companies where a single shareholder had an interest of 20% or more as proxy one for ownership concentration (H15). As discussed below, two different information sources were examined to measure H15: INET BFA and Profile data. INET BFA provides ownership information as per the latest annual reports, as well as according to STRATE[165].

Although only dematerialised[166] shares can be traded on the JSE, the decision to hold a share certificate or to dematerialise is a voluntary decision. However, only dematerialised share ownership is available from STRATE, and INET BFA therefore calculates 'certificated shareholdings' as the balancing figure for shareholdings where the ownership is not available from STRATE. Further, foreign shareholding is also not available from STRATE and, as such, is included in the certificated shareholding balancing figure calculation by INET BFA.

As alternative to the STRATE ownership data, ownership information as published via annual reports is also available via INET BFA. Section 8.63 I of the JSE listing requirements (JSE, 2016a) requires

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[165] Share transactions totally electronic (STRATE) is the licensed Central Securities Depository (CSD) for electronic settlements in South Africa.

[166] In terms of the Security Services Act (SSA) 36 of 2004, share certificates may be handed in for custody at a depository institution. Dematerialisation is the process where share certificates are handed in at a CSD participant where any subsequent transfer of shares is effected with an electronic change of the name of the particular person in the records of the CSD participant (Havenga & Locke, 2010: 53). The South African Financial Markets Act of 2012 defines a CSD as a facility which provides services that include the custody and administration of securities, the clearing of transactions in listed securities and the settlement of transactions in listed securities (Van Wyk, Botha & Goodspeed, 2015: 214).

companies to disclosure a list of shareholders with a beneficial interest exceeding 5%. More specifically, paragraph I requires companies to disclose (JSE, 2016a):

> the interest of any shareholder, other than a director, who, in so far as it is known to the company, is directly or indirectly beneficially interested in 5% or more of any class of the listed company's capital, together with the amount of each such shareholder's interest or, if there are no such shareholders, an appropriate negative statement. [underlining inserted]

According to STRATE (2015: 19) the securities register of a company comprises the principal certificated register and the electronic sub-register. The sub-register reflects registered ownership and not beneficial ownership. Havenga and Locke (2010: 54) distinguished between nominee and beneficial holders of shares as follows. The nominee holder is the person or the entity in whose name the shares are registered, while the beneficial holder is the person who is entitled to the rights attached to the share. The Central Securities Depository (CSD) participants and not the company maintain and administer these sub-registers. According to STRATE (2015: 21), nominees must disclose the identity of beneficial holders as well as the number and classes of shares held to the issuer company in respect of shares registered in the name of a nominee.

Further, as the JSE listing requirements are only applicable to companies with a primary listing on the JSE, not all companies disclose a list of beneficial shareholders. This being the case, shareholder information, as available via Profile Data, was also examined and compared with data extracted from INET BFA. If INET BFA STRATE, INET BFA annual report data or Profile Data listed a single shareholder with an interest of 20% or more, a dummy variable of one was assigned. Four companies were assigned this dummy variable based on Profile Data, not listed as such according to INET BFA.

Given the limitations as discussed above, the measurement of this variable (H15) (i.e. dummy variable for 20% shareholding) is probably understated and results should therefore be interpreted with the necessary caution.

The second ownership concentration proxy used in this study was the director shareholding percentage. The director shareholder percentage was extracted from INET BFA (product called financial statements under Sundry Data[167]). According to INET BFA, the director shareholder percentage is the number of shares held by the directors of the company, whether direct or indirect, beneficial or non-beneficial. The ownership dispersion proxy, free float, was captured from a spreadsheet received directly from a JSE representative.

A negative association between IIR level and the two ownership concentration proxies, i.e. single ownership exceeding 20% (H15) and director shareholding percentage (H13) was expected, and,

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[167] Three different INET BFA line items were used: Directors' shareholding beneficial (non-gold) + Directors' shareholding non-beneficial (non-gold) + Directors' shareholding % (gold).

as discussed, a positive association between IIR level and the ownership dispersion proxy, free float (H14) was expected.

5.4 METHOD OF STATISTICAL ANALYSIS

Various statistical software packages are available for analysis in statistics and econometrics. For the purpose of this study, Statistica was used. Statistica (2016) defines stepwise regression as a model-building technique that finds subsets of predictor (i.e. independent) variables that most adequately predict responses on a dependent variable by regression, given the specified criteria for adequacy of model fit. According to Keller and Warrack (1997: 871), stepwise regression is an iterative procedure that adds and deletes one independent variable at a time, where the decision to add or delete a variable is made on the basis of whether the variable improves the model or not. According to Keller and Warrack (1997: 875), stepwise regression procedures produce equations that include only independent variables that are statistically significant in the presence of the other variables in the model.

Stepwise regression is a well-known statistical procedure that is often used in empirical research and discussed in regression textbooks, such as Keller and Warrack (1997: 871-875), Cramer (2003: 59-73), Fujikoshi, Ulyanov and Shimizu (2010: 194-197), Afifi, Clark and May (2004: 174-192), Sharma (1996: 265-273) and Meyers, Gamst and Guarino (2006: 171-176). Further, the use of the stepwise regression is supported by well-known statistical packages such as SAS, SPSS, Statistica, Stata and R.

The stepwise regression procedure was used throughout this dissertation to develop multiple regression models (i.e. Sections 5.4 (determinants of IIR), 6.4 (information asymmetry), 7.4 (cost of debt) and 8.5 (cost of equity and cost of capital) in accordance with the third to the seventh objective set for this study in Chapter 1. The stepwise regression procedure was applied as follows all through this dissertation where applicable.

The first step was to identify independent variables that were used in the literature to explain variations in each of the dependent variables that were examined. Based on theory and the results found in prior studies, an anticipated association between each independent variable and the dependent variable examined was hypothesised. Normality plots and histograms were examined for all variables and where appropriate, the natural logarithm of variables were used to reduce the skewness of distributions. Log transformation is a well-known method to remedy non-normality (Keller & Warrack, 1997; Sharma, 1996; Afifi *et al.,* 2004; Cramer, 2003) and to summarise what follows, was successfully applied throughout this dissertation to rectify non-normality as evident from visual inspections of normality plots and histograms. Pearson correlation coefficients between independent variables (i.e. correlation matrix) were examined to identify highly correlated independent variables. Where appropriate, an alternative proxy was used for independent variables to avoid multicollinearity.

Stepwise regression results were examined for statistical fit, theoretical sensibility of directions and econometric criteria. The statistical fit of each model was firstly assessed using the reported t-values to ensure that all independent variables included in the model have significant coefficients at the 10% or better level. Secondly the ANOVA table was examined to assess the F-value and the adjusted R^2 to ensure the overall fit of the regression model.

The signs of the significant independent variables in each regression model were examined to ensure the theoretical sensibility thereof. More specifically, the directions of significant coefficients were compared to the hypothesised associations.

Finally, the required conditions for the validity of a regression analysis were inspected. The first requirement is that residuals should be approximately normally distributed. Histograms of the raw residuals and normality plots of residuals were examined for this purpose, as well as to identify any influential outliers. The second requirement is that the variance of the error variable (i.e. residual) is constant. A violation of the second requirement is referred to as heteroscedasticity. Residual plots of predicted versus residuals were examined throughout this dissertation for any evidence of heteroscedasticity. Where necessary the Breusch-Pagan test was used to test and control for heteroscedasticity.

The third requirement is the nonindependence of the error variable. A violation of the third requirement is referred to as autocorrelation. The data in this dissertation are cross-sectional as all measurements were made between March and September 2015. Although autocorrelation is more frequently observed with time-series data, the existence of autocorrelation was assessed throughout this dissertation by means of the Durbin-Watson test statistic.

A further problem that is applicable to multiple regression models, is multicollinearity. Multicollinearity is a condition that exists where the independent variables are correlated with one another. According to Keller and Warrack (1997: 808), multicollinearity distorts the t-tests of the coefficients, making it difficult to interpret the coefficients. One of the advantages of the stepwise regression technique is that muliticollinearity is inherently considered in the model-building methodology. Notwithstanding this advantage, tolerance values were monitored in all regression models throughout this study.

Given research objective 3 (to establish the determinants of IIR), and the number of independent variables as identified and discussed in Section 5.3 above, the stepwise regression method was used. Tables 5.2 and 5.3 show the description of variables that were entered into the stepwise regression models. For three independent variables (market capitalisation, market-to-book ratio, and the number of years listed), the natural logarithm was used to reduce the skewness in the distribution of these variables. Log transformations are often used in the literature to transform independent variables such as market capitalisation (Larrán & Giner, 2002), market-to-book ratio (Bollen *et al.*, 2006), and the number of shareholders (Ettredge *et al.*, 1999).

Table 5.2: Dependent variables used in the stepwise regression models of IIR

Acronym	Variable	H	Description
Dependent variables			
IIR	Internet investor relations score, including all attributes (i.e. 346)		The total IIR score per company, i.e. the sum of the 346 attributes, as discussed in Chapter 4
IIR-90, IIR-80; IIR-70; IIR-60; IIR-50	Internet investor relations score, including 270 (IIR-90), 189 (IIR-80), 128 (IIR-70), 95 (IIR-60) and 60 (IIR-50) attributes		Attributes with average availabilities less than 10%, 20%, 30%, 40% and 50% were removed from the calculation of the IIR score to calculate the following alternative IIR groupings IIR-90, IIR-80, IIR-70, IIR-60 and IIR-50

Table 5.3: Independent variables used in the stepwise regression models of IIR

Acronym	Variable	H	Description
Independent continuous variables			
SIZE	Market capitalisation	1	Natural logarithm of the average daily market capitalisation of all trading days from 1 December 2014 to 30 November 2015
LEV	Leverage	2	Ratio between debt and assets
CUR	Current ratio	3	Ratio between current assets and current liabilities
ROE	Financial performance	4	Ratio between profit to ordinary shareholders interest
MTB	Market-to-book value	5	Natural logarithm of the ratio between the share price (market value) and the book value of equity
LIST.Y	Number of years listed	12	Natural logarithm of the number of years listed as on the date the IIR of each company was measured
DIR.SH	Director shareholding percentage	13	The percentage direct and indirect, beneficial and non-beneficial shareholding of directors
F.FLT	Free float percentage	14	Ratio between the total issues shares minus restricted shares to the total issued shares

Table 5.3: Independent variables used in the stepwise regression models of IIR (continued)

Independent categorical variables			
NET.ISS	Net issue of shares	6	Dummy variable representing one if the company on net has issued shares in the preceding 12-month period
NET.BB	Net buy back of shares	7	Dummy variable representing one if the company on net has bought back shares in the preceding 12-month period
AUDIT	Big four audit	8	Dummy variable representing one if the company is audited by either PwC, KPMG, Deloitte & Touche or Ernst & Young
IND.JSE	JSE industry classification	9a – 9j	JSE industry classification. Each company is assigned to one of the following ten industries: basic material (9a), consumer goods (9b), consumer services (9c), financials (9d), healthcare (9e), industrials (9f), oil and gas (9g), technology (9h), telecommunications (9i) and utilities (9j)
LIST.D	Dual listing	10	Dummy variable representing one if the company is dually listed on the JSE and any other stock exchange
Acronym	**Variable**	**H**	**Description**
LIST.P	Primary listing	11	Dummy variable representing one if the company has a primary listing other than the JSE
20%.SH	Block ownership	15	Dummy variable representing one if one shareholder has more than 20% of issued shares

Table 5.4 summarises the expected associations between each of the independent variables as listed in Table 5.3 above and IIR. These expected associations were discussed in Section 5.3 above.

Table 5.4: Expected associations between IIR and independent variables

Independent variables	**IIR**
Market capitalisation (SIZE)	+
Leverage (LEV)	+
Current ratio (CUR)	-
Financial performance (ROE)	+
Market to book (MTB)	+
Net issue of shares (NET.ISS)	+
Net buy back of shares (NET.BB)	-
Big four audit (AUDIT)	+
Industry (IND.JSE)	+ / -
Dual listing (LIST.D)	+
Primary listing (LIST.P)	+
Number of years listed (LIST.Y)	+
Director shareholding percentage (DIR.SH)	-
Block ownership (20%.SH)	-
Free float percentage (F.FLT)	+

5.5 RESULTS

5.5.1 Selected descriptive statistics

The descriptive statistics are set out in Table 5.5. Statistics for market capitalisation, the market-to-book ratio and the number of years listed are presented prior to the natural logarithmic transformations, which were used in the multivariate regression analysis.

The results indicated that the highest IIR score (IIR) achieved by any company was 193.50 (British American Tobacco), while the lowest was 13.5 (AH-Vest). The average was 97.98. These results suggest that, across the 85 JSE-listed companies in the sample, there was widespread variation in the level of IIR.

The smallest company included in the sample, AH-Vest (formerly All Joy Foods), had a market capitalisation of only R38.67 million compared to the largest company, British American Tobacco, which had a market capitalisation of R1 411 045 million. The average market capitalisation was R49 409 million. These results support the objective of the sample selection criteria followed in Section 4.2 to select a sample that would ensure significant cross-sectional variation. Similar to the market capitalisation, the market-to-book value ratio showed similar variation, as expected.

The smallest company in the sample, AH-Vest, therefore also had the lowest IIR score and the largest company, British American Tobacco, the highest IIR score.

Table 5.5: Descriptive statistics: variables used to examine variations in IIR

Panel A: Dependent variables							
	Average	**Minimum**	**Quartile**			**Maximum**	**Standard deviation**
			Q1	**Q2**	**Q3**		
IIR	97.98	13.50	67.00	96.00	130.50	193.50	43.18
IIR-90	93.85	13.50	66.00	92.50	122.50	172.00	39.45
IIR-80	82.06	13.50	61.00	82.00	104.50	135.00	30.71
IIR-70	67.23	12.50	53.00	69.00	85.50	101.00	22.01
IIR-60	55.92	12.50	46.50	57.50	69.50	79.00	16.86
IIR-50	39.97	9.50	35.50	42.50	47.00	55.00	10.16

Table 5.5: Descriptive statistics: variables used to examine variations in IIR (continued)

Panel B: Continuous independent variables							
	Average	**Minimum**	**Quartile**			**Maximum**	**Standard deviation**
			Q1	**Q2**	**Q3**		
Market cap (ZAR' 000 000)	49 409.17	38.67	584.88	6 247.90	25 944.84	1 411 045.16	169 730.55
Leverage (debt/assets)	0.45	0	0.28	0.40	0.61	1.21	0.25
Current ratio	5.07	0.03	0.99	1.32	1.94	159.31	22.52
Financial performance (ROE)	11.03	-40.09	2.78	12.77	20.62	84.02	21.14
Market-to-book value	2.28	0.13	0.89	1.43	2.88	12.99	2.53
Number of years listed	22.75	1.78	8.94	17.19	27.58	75.23	17.99
Director shareholding (%)	13.88	0.00	0.10	2.87	23.13	81.79	20.47
Free float (%)	59.70	2.50	36.00	60.00	87.00	100.00	28.63

Panel C: Categorical independent variables			
	Yes (1)	No (0)	Total
Net issue of shares	36	49	85
Net buy back of shares	15	70	85
Big four audit	61	24	85
Basic material industry	17	68	85
Consumer goods industry	7	78	85
Consumer services industry	10	75	85
Financial industry	21	64	85

Table 5.5: Descriptive statistics: variables used to examine variations in IIR (continued)

Panel C: Categorical independent variables			
	Yes (1)	No (0)	Total
Healthcare industry	3	82	85
Industrials industry	19	66	85
Oil and gas industry	1	84	85
Technology industry	4	81	85
Telecommunications industry	2	83	85
Utilities industry	1	84	85
Dual listing	25	60	85
Primary listing (other JSE)	14	71	85
Block ownership	52	33	85

The average leverage[168] was 0.45. As this ratio was smaller than 0.5, it showed that on average the assets of the sample companies were primarily financed through equity. The third (Q3) quartile however was 0.61, showing that 25% of companies financed the majority of their assets through debt. Brait SE, an investment holding company, had no debt on measurement date and therefore the minimum leverage was 0. Although the current ratio[169] varied between as low as 0.03 to a maximum of 159.31, it should be noted that only three companies (Tawana Resources, Randgold and Brait SE) had a current ratio of more than 5.

The average company was profitable, with an average return on equity (ROE) of just over 11%. Profitability, as measured with ROE, however, varied significantly with the lowest ROE reported by Sentula Mining, reflecting a loss of -40%, and the highest ROE of 84% reported by Randgold. As suggested by the average (11.03%) and the median (12.77%), ROE closely resemble a normal distribution.

The average company was listed on the JSE for nearly 23 years, with 25% of the companies listed for more than 27 years and 25% listed for less than nine years. Twenty-five companies had a dual listing and were therefore listed on both the JSE and at least one additional international stock exchange, for example the London Stock Exchange (LSE) and New York Stock Exchange (NYSE). Fourteen companies had only a secondary listing on the JSE, with a primary listing on a stock

[168] Ratio between debt and assets.
[169] Ratio between current assets and current liabilities.

exchange other than the JSE.[170] Regarding financing activities, 36 companies on net issued shares during 2015, and 15 companies on net bought back shares.

On average, 13.88% of shares were held by directors. As showed by the first (Q1) and third (Q3) quartiles, directors' shareholding varied significantly, with 25% of companies where directors had almost no shares (less than 0.1% of issued shares) as opposed to 25% of companies where directors held about one quarter of issued shares. Similar variations were evident in an analysis of the distribution of the free float percentage, which is an indication of the percentage of unrestricted shares, i.e. shares that are expected to be available to trade. Of the 85 companies in the sample, 52 had a single shareholder who owned more than 20% of the issued shares.

Although, the majority of the companies (61) were audited by PwC, KPMG, Deloitte & Touche or Ernst & Young, almost 30% were audited by smaller audit companies.

5.5.2 Correlation analysis

Table 5.6 provides a comparison between the 22 companies with an IIR score less than the 25th percentile, (the lower quartile companies) and the 21 companies with an IIR score above the 75th percentile (the upper quartile companies). All results reported in Table 5.6 are as expected and as summarised in Table 5.4 above.

The lower quartile companies are smaller (market capitalisation), have less debt (leverage) and are less profitable (ROE) compared to the upper quartile companies. Further, the lower quartile companies have a higher average director shareholding percentage and smaller free float percentage compared to the upper quartile companies. Lower quartile companies on average have been listed 18 years, compared to the upper quartile companies that are on average listed for 34 years.

[170] These 14 companies had primary listings as follows: London Stock Exchange (LSE) (6), Australian Stock Exchange (AUSX) (2), Luxembourg Stock Exchange (LUSE) (1), Frankfurt Stock Exchange (FSX) (1), Toronto Stock Exchange (TSX) (2), Bucharest Stock Exchange (BVB) (1), and Mauritius Stock Exchange (MSX) (1).

Table 5.6: A comparison of the bottom and top quartile companies: IIR scores

Variable	Total sample	IIR score < 25th percentile	IIR score > 75th percentile
Size (market capitalisation)			
Average (R' million)	49 409.17	2 610.59	151 694.53
Standard deviation (R' million)	169 730.55	4 589.14	311 980.68
Median (R' million)	6 247.90	212.79	22 329.97
Leverage (debt/assets)			
Average	0.45	0.35	0.61
Standard deviation	0.25	0.22	0.27
Median	0.40	0.32	0.59
Current ratio			
Average	5.07	8.04	1.33
Standard deviation	22.52	28.44	0.56
Median	1.32	1.34	1.28
Financial performance (ROE)			
Average	11.03	8.52	15.53
Standard deviation	21.14	24.67	17.55
Median	12.77	9.67	13.56
Market-to-book value			
Average	2.28	1.63	3.16
Standard deviation	2.53	1.58	3.84
Median	1.43	1.03	1.70
Number of years listed			
Average	22.75	18.11	34.03
Standard deviation	17.99	11.24	23.75
Median	17.19	16.46	21.14
Director shareholding percentage			
Average	13.88	19.82	4.96
Standard deviation	20.47	22.79	12.54
Median	2.87	8.56	0.27
Free float percentage			
Average	59.70	46.11	78.90
Standard deviation	28.63	26.83	24.93
Median	60.00	40.00	92.00

Table 5.7 shows the Pearson correlation coefficients between IIR, as well as the five alternative IIR groupings (IIR-90; IIR-80; IIR-70; IIR-60 and IIR-50) as discussed in Chapter 4, and the independent variables as listed in Table 5.3. According to Table 5.7, size, leverage, being audited by a big four audit company, having a dual listing, directors' shareholding, free float and blockholder ownership

(single shareholder with more than 20% interest) are all statistically significantly correlated at the 5% or better level with IIR. All coefficients are as expected.

Table 5.7: Correlation matrix: alternative IIR groupings and independent variables

		IIR	IIR-90	IIR-80	IIR-70	IIR-60	IIR-50
SIZE	**H1**	0.65	0.64	0.61	0.59	0.57	0.54
LEV	**H2**	0.37	0.36	0.36	0.34	0.33	0.29
CUR	**H3**	-0.12	-0.13	-0.12	-0.12	-0.13	-0.10
ROE	**H4**	0.10	0.09	0.08	0.05	0.05	0.04
MTB	**H5**	0.12	0.10	0.09	0.06	0.07	0.05
NET. ISS	**H6**	0.21	0.21	0.22	0.24	0.22	0.22
NET. BB	**H7**	-0.09	-0.10	-0.14	-0.18	-0.18	-0.17
AUDIT	**H8**	0.44	0.44	0.42	0.38	0.35	0.26
BM	**H9a**	0.06	0.07	0.06	0.06	0.05	0.08
CG	**H9b**	-0.07	-0.09	-0.11	-0.13	-0.10	-0.12
CS	**H9c**	-0.09	-0.10	-0.12	-0.15	-0.17	-0.20
F	**H9d**	-0.01	-0.01	-0.02	-0.01	-0.02	-0.01
HC	**H9e**	0.03	0.03	0.04	0.04	0.00	0.00
I	**H9f**	0.01	0.02	0.05	0.08	0.11	0.14
OG	**H9g**	0.03	0.04	0.05	0.05	0.03	0.00
TEC	**H9h**	-0.05	-0.04	-0.01	0.02	0.03	0.03
TEL	**H9i**	0.22	0.21	0.17	0.18	0.17	0.09
U	**H9j**	-0.08	-0.08	-0.07	-0.07	-0.09	-0.09
LIST.D	**H10**	0.26	0.26	0.22	0.21	0.19	0.18
LIST.P	**H11**	0.15	0.13	0.13	0.14	0.15	0.17
LIST.Y	**H12**	0.19	0.19	0.15	0.10	0.06	-0.02
D.SH	**H13**	-0.30	-0.31	-0.29	-0.27	-0.28	-0.27
F. FLT	**H14**	0.37	0.38	0.38	0.36	0.34	0.30
20%.SH	**H15**	-0.27	-0.26	-0.26	-0.23	-0.23	-0.25

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level; SIZE (market capitalisation); LEV (leverage); CUR (current ratio); ROE (return on equity); MTB (market-to-book ratio); NET.ISS (net issue of shares); NET.BB (net buy back of shares); AUDIT (big four audit); BM (basic material); CG (consumer goods); CS (consumer services); F (financials); HC (healthcare); I (industrials); OG (oil and gas); TEC (technology); TEL (telecommunications); U (utilities); LIST.D (dual listing); LIST.P (primary listing); LIST.Y (years listed); D.SH (director shareholding percentage); F.FLT (free float percentage); 20%.SH (block ownership)

All these variables are also significant at the 5% level for the five alternative IIR groupings, except for dual listing. The dummy variable used for dual-listed companies was only significant at the 10% level for IIR-70 and IIR-60, and not significant for IIR-50. The number of years listed was only significant at the 10% level and only for two IIR scores, IIR and IIR-90. The dummy variable used for companies that on net issued shares during 2015, NET.ISS, increased in significance as the number

of attributes measured decreased according to their average availabilities. NET-ISS was statistically significant at the 10% level for IIR and IIR-90, but at 5% for IIR-80, IIR-70, IIR-60 and IIR-50.

The dummy variable used for companies that on net bought back shares during 2015, NET.BB, was only significant at the 10% level for one of the disclosure scores, IIR-70. Regarding JSE industries, only the telecommunications industry showed a significant association at the 5% level and only for two disclosure scores, IIR and IIR-90. The consumer services industry (CS) dummy variable was statistically significant at the 10% level and only for IIR-50.

Table 5.8 shows Pearson correlation coefficients between the independent variables listed in Table 5.3.

Only two correlations in Table 5.8 are higher than 0.5. The correlation between the market-to-book ratio (H5) and the return on equity (ROE) (0.54) and the correlation between dual listing (H10) and primary listing (H11) (0.69). The high correlation between dual listing and primary listing was expected as 14 of the 25 companies with a dual listing also have a primary listing other than the JSE.

Table 5.8: Correlation matrix: independent variables used to examine variations in IIR

	H1	H2	H3	H4	H5	H6	H7	H8	H9a	H9b	H9c	H9d	H9e	H9f	H9g	H9h	H9i	H9j	H10	H11	H12	H13	H14	H15
	SIZE	LEV	CUR	ROE	MTB	NET.ISS	NET.BB	AUDIT	BM	CG	CS	F	H	I	OG	TEC	TEL	U	LIST.D	LIST.P	LIST.Y	DIR.SH	F.FLT	20%.SH
H1	1.00																							
H2	0.28	1.00																						
H3	-0.02	-0.30	1.00																					
H4	0.41	0.06	0.44	1.00																				
H5	0.49	0.27	-0.07	0.54	1.00																			
H6	0.41	-0.03	0.04	0.13	0.33	1.00																		
H7	0.02	0.01	-0.08	0.00	-0.02	-0.40	1.00																	
H8	0.42	0.07	0.09	0.27	0.14	0.11	-0.26	1.00																
H9a	-0.23	-0.25	0.11	-0.25	-0.38	-0.25	0.00	0.12	1.00															
H9b	0.12	0.09	-0.05	0.02	0.14	0.00	-0.14	0.00	-0.15	1.00														
H9c	0.16	0.19	-0.06	0.29	0.49	0.13	-0.17	0.23	-0.18	-0.11	1.00													
H9d	0.27	-0.06	0.09	0.17	0.08	0.23	0.16	0.06	-0.29	-0.17	-0.21	1.00												
H9e	-0.01	0.07	-0.03	-0.03	0.10	0.22	-0.09	-0.02	-0.10	-0.06	-0.07	-0.11	1.00											
H9f	-0.23	0.03	-0.08	-0.14	-0.22	-0.17	0.12	-0.29	-0.27	-0.16	-0.20	-0.31	-0.10	1.00										
H9g	-0.06	-0.08	-0.02	-0.24	-0.03	-0.09	-0.05	0.07	-0.05	-0.03	-0.04	-0.06	-0.02	-0.06	1.00									
H9h	-0.07	0.10	-0.03	0.04	0.03	0.03	-0.10	-0.11	-0.11	-0.07	-0.08	-0.13	-0.04	-0.12	-0.02	1.00								
H9i	0.21	-0.01	-0.03	0.06	0.06	0.02	0.13	0.10	-0.08	-0.05	-0.06	-0.09	-0.03	-0.08	-0.02	-0.03	1.00							
H9j	-0.19	0.00	-0.02	-0.04	-0.15	-0.09	-0.05	-0.17	-0.05	-0.03	-0.04	-0.06	-0.02	-0.06	-0.01	-0.02	-0.02	1.00						
H10	0.20	-0.09	0.24	-0.10	-0.13	0.18	-0.10	0.18	0.32	-0.01	-0.16	0.11	-0.12	-0.35	0.17	-0.02	0.07	0.17	1.00					
H11	0.16	-0.03	0.15	-0.09	-0.12	0.20	-0.12	0.00	0.17	0.10	-0.16	0.19	-0.08	-0.24	-0.05	-0.10	-0.07	0.25	0.69	1.00				
H12	0.16	0.07	0.10	0.14	-0.02	-0.23	0.16	0.31	0.14	-0.03	0.15	-0.16	-0.06	-0.03	0.03	0.02	-0.01	-0.08	-0.07	-0.37	1.00			
H13	-0.35	0.00	0.04	-0.07	-0.08	-0.11	0.09	-0.25	-0.15	0.06	-0.09	-0.16	0.18	0.30	-0.07	0.06	-0.10	-0.07	-0.31	-0.17	-0.06	1.00		
H14	0.39	0.02	0.03	0.19	0.03	0.20	-0.12	0.26	-0.06	-0.18	0.13	0.09	-0.04	0.02	-0.14	0.05	0.09	-0.15	-0.05	-0.14	0.15	-0.39	1.00	
H15	-0.34	-0.20	0.12	-0.17	-0.33	-0.29	0.12	-0.02	0.16	-0.02	-0.16	0.06	-0.11	-0.04	0.09	-0.05	-0.04	0.09	-0.07	-0.23	0.21	0.16	-0.32	1.00

Red = significant at the 5% or better level; Blue = significant at 10% level. Notes: SIZE (market capitalisation); LEV (leverage); CUR (current ratio); ROE (return on equity); MTB (market-to-book ratio); NET.ISS (net issue of shares); NET.BB (net buy back of shares); AUDIT (big four audit); BM (basic material); CG (consumer goods); CS (consumer services); F (financials); HC (healthcare); I (industrials); OG (oil and gas); TEC (technology); TEL (telecommunications); U (utilities); LIST.D (dual listing); LIST.P (primary listing); LIST.Y (years listed); D.SH (director shareholding percentage); F.FLT (free float percentage); 20%.SH (block ownership).

5.5.3 Regression estimation results

Table 5.9 presents the multivariate regression results of the stepwise regressions that were performed using the dependent and independent variables, as listed and described in Tables 5.2 and 5.3 above. The dataset which was applied in the stepwise regression model comprised IIR scores for the 85 companies included in the study sample.

For the convenience of the reader, all regression coefficients that were statistically significant at the 1% or better level are printed in **green**; those at the 5% or better level in **blue**; and, finally, those at the 10% or better level in red. The regression results depicted in Table 5.9 are further discussed in Sections 5.5.3.1 to 5.5.3.6.

As discussed in Section 5.4, one of the advantages of the stepwise regression technique is that muliticollinearity is inherently considered in the model-building methodology. Notwithstanding this advantage, tolerance values were monitored for all regression models reported in Table 5.9 and the minimum tolerance value was 0.50.

Statistica (2016) defines the tolerance of a variable as 1 minus the squared multiple correlation of this variable with all other independent variables in the regression equation. The smaller the tolerance of a variable, the more redundant is its contribution to the regression (i.e. it is redundant with the contribution of other independent variables). Some studies reported variance inflation factors (VIF) to indicate potential multicollinearity. The VIF is calculated as 1 / tolerance. The maximum VIF regression model reported here is therefore 2 (1 / 0.5).

The results of the Durbin-Watson statistics were all between 1.84 and 2.27, confirming the absence of autocorrelation (see Table 5.9).

As discussed in Section 5.4, histograms of the raw residuals, as well as normality plots of residuals, were examined, and, for all regression results reported here, results suggested that residuals were approximately normally distributed. Residual plots of predicted versus residuals were examined, and no evidence of heteroscedasticity were found in any of reported regression models.

Table 5.9: Regression results: regression of IIR on significant independent variables

	IIR	IIR-90	IIR-80	IIR-70	IIR-60	IIR-50
$\beta 0$	-151.91	-132.47	-102.30	-63.80	-47.27	-26.39
SIZE	9.69	9.13	7.96	5.82	4.78	2.79
LEV	51.66	40.91	31.95	22.11	16.11	9.78
CUR		-0.20				
AUDIT	21.45	18.03	13.96	7.14		
JSE CS	-52.99	-51.59	-42.89	-33.46	-25.04	-9.78
JSE CG	-37.92	-40.34	-37.34	-29.53	-21.78	-7.47
JSE F	-32.16	-28.17	-22.27	-15.97	-12.23	-7.25
JSE TEC	-21.89	-20.92				
JSE BM						7.45
JSE I						7.75
NET.BB		-11.67	-13.44	-13.87	-11.94	-7.89
F.FLT	20.18	17.91				
LIST.D	10.79	9.72				
Adjusted R^2	68.76%	69.79%	67.12%	67.72%	63.65%	61.68%
F-value	21.55	18.64	25.50	26.17	25.52	20.32
Durbin-Watson	2.26	2.27	2.07	1.98	1.94	1.84

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level; SIZE (market capitalisation); LEV (leverage); CUR (current ratio); AUDIT (big four audit); JSE CS (consumer services); JSE CG (consumer goods); JSE F (financials); JSE TEC (technology); JSE BM (basic materials); JSE I (industrials); NET.BB (net buy back of shares); F.FLT (free float percentage); LIST.D (dual listing)

5.5.3.1 Internet investor relations (IIR)

As depicted in Table 5.9, market capitalisation (SIZE), leverage (LEV), being audited by a big four audit company (AUDIT), JSE industry membership (CS, CG, F and TEC), free float (F.FLT), and dual listing (LIST.D) are explanatory factors that explain the level of IIR in JSE-listed companies.

As expected, coefficients for SIZE, LEV and AUDIT were positive and statistically significant at the 1% or better level. As discussed in Section 5.3.1, almost all prior studies showed a significant positive association between disclosure and company size. Froidevaux (2004), Bollen *et al.* (2006) and Orens *et al.* (2010) all document a significant positive association between website disclosure and company size.

Agency theory is often used in the literature as underlying theoretical foundation to hypothesise a positive association between disclosure and leverage (Debreceny *et al.*, 2002; Xiao *et al.*, 2004 and Larrán and Giner, 2002). As opposed to the association between disclosure and size, empirical research to date has produced mixed results on the association between disclosure and leverage. Following Xiao *et al.* (2004: 215) and Celik *et al.* (2006), this study provides further support for a positive association between website disclosure and leverage.

As discussed in Section 5.3.7, signalling theory and agency theory both support the hypothesis of a positive association between disclosure and being audited by a big four audit company (i.e. Deloitte & Touche, Ernst & Young, KPMG[171] and PwC[172]). The positive association found in this study between IIR and being audited by a big four audit company do provide support for Xiao *et al.* (2004), Bonsón and Escobar (2002) and Wang *et al*. (2008).

Further, as expected and discussed in Section 5.3.8 above, companies tended to disclose information similar to that disclosed by their industry peers. More specifically, the results in Table 5.9 showed that lower IIR levels can be expected from companies categorised as constituents of the consumer goods, consumer service, financial, and technology JSE industries rather than other JSE industries.[173] Table 4.9 in Section 4.6 shows the average IIR score per JSE sector. The consumer goods, consumer services, financial and technology sectors all had a lower average IIR score compared to the average for the total sample.

Also as expected, coefficients for the free float percentage (F.FLT) and the dual-listed dummy variable (LIST.D) were positive, but only statistically significant at the 10% level. Marston and Polei (2004) also found a significant positive association between free float and website disclosure for their 2000 sub-sample, but found no association for their 2003 sub-sample. A positive association between having a dual listing and website disclosure was reported by Xiao *et al*. (2004), Debreceny *et al.* (2002), Bollen *et al.* (2006: 291) and Aly *et al.* (2010: 191).

The magnitude of the reported adjusted R^2 of 68.76% compared favourably to studies such as Hail (2002) that reported an adjusted R^2 of 34.2%; Almilia (2009) (47.6%); Leventis and Weetman (2004) (35.6%); Celik *et al.* (2006) (33%); Marston and Polei (61.7%); Trabelsi *et al.* (2008) (35.42%); Aly *et al.* (2010) (70%); Cormier *et al.* (2009) (27.9%); Ettredge *et al.* (2002) (17.5%); Bollen *et al.* (2006) (21.1%); Pervan (2006) (69%); Xiao *et al.* (2004) (11%); Abdelsalam *et al.* (2007) (35.8%); Larrán and Giner (2002) (33.2%), and Bonsón and Escobar (2006) (50%).[174]

5.5.3.2 IIR-90

As with the dependent variable, IIR, market capitalisation (SIZE), leverage (LEV), being audited by a big four audit company (AUDIT), JSE industry membership (CS, CG, F and TEC), free float percentage (F.FLT) and dual listing (LIST.D) are explanatory factors that explain the level of IIR-90 in JSE-listed companies. Further to these variables, Table 5.9 shows that the current ratio (CUR) and the net buy back variable (NET.BB) were significant independent variables, both negative (as expected) and statistically significant at the 10% level.

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[171] Klynveld Peat Marwick Goerdeler (KPMG)
[172] PricewaterhouseCoopers (PwC)
[173] JSE industry classification is based on the industry classification benchmark (ICB). The ICB consists of four levels of classification. At the top level there are 10 industries. As discussed in Chapter 4, the study sample was randomly selected based on a population stratified according to the 10 industries.
[174] The highest R^2 as reported in each study is listed here.

The negative association found in this study between IIR-90 and the current ratio (CUR), provide support for the reasoning by Aly *et al.* (2010) that less liquid companies may disclose more information to satisfy the information needs of shareholders and creditors. Aly *et al.* (2010), however, found no significant association between disclosure and the current ratio. Trabelsi *et al.* (2008) found a significant positive association between their measure of financing activities (i.e. dummy variable of one if any new debt or equity has been issued) and corporate website disclosure. The negative association found in this study between the net buy back variable (NET.BB) and IIR-90 therefore do provide some support for the positive association found by Trabelsi *et al.* (2008) between the issue of shares and disclosure.

5.5.3.3 IIR-80

As with the IIR and IIR-90 regression models, market capitalisation (SIZE), leverage (LEV), being audited by a big four audit company (AUDIT), and JSE industry membership (CS, CG and F) are explanatory factors that explain the level of IIR-80 in JSE-listed companies.

The net buy back variable (NET.BB) was slightly more significant at the 5% level compared to the IIR-90 regression model. The CUR, TEC, F.FLT and LIST.D variables that were all significant in the IIR-90 regression model were, however, not statistically significant in the IIR-80 regression model. The adjusted R^2 was slightly lower compared to the IIR and IIR-90 regression models.

5.5.3.4 IIR-70

Similar regression results were reported compared to the IIR-80 regression model, with the only difference that Net.BB was now statistically significant at the 1% level, and AUDIT only at the 5% level. The adjusted R^2 was slightly higher compared to the IIR-80 regression model.

5.5.3.5 IIR-60

All independent variables included in the IIR-70 regression model were statistically significant at the 1% or better level, except for the AUDIT variable which was found not statistically significant. Possible reasons for the AUDIT variable being non-significant in this regression model are discussed in Section 5.6 below.

5.5.3.6 IIR-50

In addition to the IIR-60 regression model, two additional JSE industry variables were significant in this regression model: basic materials (JSE BM) and industrials (JSE I). Similar results were reported in Table 4.9 in Section 4.6. Table 4.9 shows the average IIR score per JSE sector. Both basic materials and the industrials sector had higher IIR scores compared to the average for the total sample.

5.6 SUMMARY AND CONCLUSION

The third objective of the study was to establish the determinants of IIR. The purpose of this chapter was to establish the determinants of IIR by means of a regression model linking IIR to selected explanatory variables as identified in the literature. The development of alternative IIR groupings, i.e. IIR-90, IIR-80, IIR-70, IIR-60 and IIR-50, were discussed in Chapter 4. The stepwise regression method was applied for each of these alternative IIR groupings.

Company-specific characteristics that were used in the literature to explain IIR levels were identified following a comprehensive literature review. Stepwise regression was used to develop the regression models. Market capitalisation (SIZE), leverage (LEV) and JSE industry membership (CS, CG and F) were statistically significant at the 1% or better level in all six regression models, as depicted in Table 5.9. Companies that were larger and had more debt had better IIR levels, but companies in the consumer services, consumer goods and financial industry tended to have lower IIR levels compared to their counterparts in other industries.

Companies that are audited by a big four audit company (AUDIT), that have a more dispersed ownership structure (F.FLT) and that have a dual stock exchange listing (LIST.D) also tended to have higher IIR scores compared to companies that were not audited by a big four audit company, had a more concentrated ownership structure and were only listed on the JSE.

To enable further analysis, five alternative subsets of the IIR score was developed and tested as dependent variable in five additional stepwise regression models, namely IIR-90, IIR-80, IIR-70, IIR-60 and IIR-50. IIR-90 was calculated to include only those 270 attributes for which an average availability of 10% or more were found in this study. In a similar fashion, IIR-80, IIR-70, IIR-60 and IIR-50 were based on respectively 189, 128, 95 and 60 attributes, i.e. including in turn only attributes with an average availability exceeding in turn 20%, 30%, 40% and 50%. The explanatory power of these additional regression models showed a slight increase with the IIR-90 regression model (69.79% compared to 68.76% for the IIR regression model that have included all 346 attributes), but decreased systematically in the other regression models to 61.68% for IIR-50.

The AUDIT variable, was significant at the 1% level in the IIR, IIR-90 and IIR-80 regression models, and at 5% in the IIR-70 regression model, but was not significant in the IIR-60 and IIR-50 regression models. Big four audit companies had more to lose from damage to their reputations and were therefore likely to impose more extensive disclosures. The IIR-60 and IIR-50 regression models included results for only 95 and 60 attributes respectively, being the attributes with average availabilities exceeding 40% and 50% availability respectively. It can be argued that these attributes did not represent those more extensive disclosures imposed by big four audit companies. The attributes included in these alternative IIR groupings (i.e. IIR-60 and IIR-50) can be viewed as basic IIR information.

On the other hand, the variable used for companies that bought back shares during the year, NET.BB, increased in significance if the number of attributes were decreased. The NET.BB was found to be not statistically significant in the IIR regression model, significant at the 10% level in the IIR-90 regression model, at the 5% level in the IIR-80 regression model and at 1% in the IIR-70, IIR-60 and IIR-50 regression models. The increasing negative significance may indicate that companies that bought back shares tended not to disclose the more basic IIR information.

In a similar vein, companies in the basic materials and industrials JSE industries had higher IIR scores, but these were significant only in the IIR-50 regression model. It appeared that companies in the basic materials and industrials JSE industries tended to disclose more of the basic IIR information compared to other industries.

CHAPTER 6
INFORMATION ASYMMETRY

6.1 INTRODUCTION

In Chapter 2 the different theories that were used in the literature to explain variations in disclosure levels were discussed. The objective of Chapter 5 was to establish the determinants of Internet investor relations (IIR) by means of a regression model linking IIR to selected explanatory variables[175]. One of the theories that was discussed in Chapter 2 was the cost–benefit analysis theory. According to this theory, the level of IIR will depend upon the outcome of a cost–benefit analysis.

This involves an understanding of both the perceived costs and the expected benefits. Costs were briefly discussed in Chapter 2 and will not be discussed further in this study as the focus of this study is an examination of the expected benefits (i.e. decreased information asymmetry and cost of capital). Brown and Hillegeist (2007) and Chang *et al.* (2008: 376) described information asymmetry as the situation where some investors have private information (i.e. they are informed traders), while others have only publicly available information (i.e. they are uninformed traders).

Empirical studies to date that have examined the effect of disclosure on information asymmetry, cost of debt and cost of equity produced mixed results. Possible reasons for such mixed results include: different proxies used for disclosure, information asymmetry, cost of debt and cost of equity; different research methodologies (e.g. sample selected); and the characteristics of the country where the data were obtained (e.g. developing or developed countries).

According to Ashbaugh *et al.* (1999: 255), IIR may increase or decrease information asymmetry across investors. If all investors have equal access to and expertise regarding the use of corporate websites as information source, IIR may decrease information asymmetry, but, if not, IIR may increase information asymmetry. Given the development of information technologies since 1999, and specifically the increased levels of accessibility to the WWW, this study assumes that investors are now far closer to achieving equal access and have greater expertise in the use of the corporate website as information source than was the case in 1999.

Ashbaugh *et al.* (1999) further argued that IIR would increase information asymmetry if IIR activities were dominated by unreliable information communicated to uninformed investors. According to Froidevaux (2004), the disclosure of information would reduce the cost of equity only if the information was useful. In a similar vein, this dissertation argue that IIR will only decrease information asymmetry if IIR is reliable and useful.

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[175] Company size, leverage, being audited by a big four audit company, industry membership, free float, having a dual listing and financing activities (i.e. buy back of shares) appeared to be the company characteristics that best explains variations in IIR levels.

The fourth objective of the study, and the purpose of this chapter, was to test for the association between the level of IIR and information asymmetry in a sample of JSE-listed companies. The remainder of this chapter is organised into five distinct sections as follows.

Firstly, Section 6.2 discusses the information asymmetry proxies that were used, as well as how these proxies were measured. Next, independent variables, besides IIR, that were used in the literature to explain variations in information asymmetry levels are discussed in Section 6.3. Section 6.4 then elaborates on the specific research methodology. In the last two sections, the results are discussed, and finally a summary and conclusion close the chapter.

6.2 INFORMATION ASYMMETRY MEASUREMENT

Leuz and Verrecchia (2000: 98–99) argued that, although economic theory suggests a negative association between disclosure and information asymmetry, it is difficult to demonstrate this empirically for a number of reasons, one being that it is not possible to observe information asymmetry directly and that an appropriate proxy should therefore be used.[176] Proxies measuring information asymmetry are often criticised as they relate inconsistently to a company's risk indicators (e.g. market beta and the market-to-book value) (Fama & French, 1992) and for being extremely sensitive to short-term information asymmetry (Khurana & Raman, 2004).

Chapter 2 discussed the following information asymmetry proxies that were used in the literature: estimation risk (analyst forecast accuracy and the number of analysts following the company), bid-ask spreads (quoted, time-weighted average, effective spread and the depth-adjusted effective spread), share turnover, price impact, probability of informed trading (PIN), and share price volatility. Table 6.1 summarises the use of these proxies and further categorises the literature according to the disclosure proxy that was used in each study. Disclosure proxies are discussed in Section 3.1.

[176] Two other reasons given by Leuz and Verrechia (2000) were that disclosure has both 'news' and information asymmetry effects and self-selection bias. Although this study acknowledges that IIR may have both a 'news' and an information asymmetry effect, this study made no attempt to examine, for example, whether information published on corporate websites represented 'good' news or 'bad' news. See Chapter 9 (Summary and Conclusion) for a further discussion thereof. Self-selection bias is addressed in the endogeneity tests as discussed in Section 6.4 and 6.5.

Table 6.1: Proxies used in the literature to measure information asymmetry

			Bid-ask spreads							
Indirect disclosure proxy	**AF**	**AFA**	**Quoted**	**Time-weighted**	**Effec-tive**	**Depth-adjus-ted**	**ST**	**PI**	**SPV**	**PIN**
Welker (1995)			X							
Healy *et al.* (1999)			X							
Leuz and Verrechia (2000)			X				X		X	
Heflin *et al.* (2005)					X	X				
Brown and Hillegeist (2007)										X
Fu *et al.* (2012)			X					X		
Agarwal *et al.* (2016)	X						X			
Direct disclosure proxy – annual report	**AF**	**AFA**	**Quoted**	**Time-weighted**	**Effec-tive**	**Depth-adjus-ted**	**ST**	**PI**	**SPV**	**PIN**
Cheng *et al.* (2006)			X				X		X	
De La Bruslerie and Gabteni (2011)		X								
Ajina *et al.* (2015)			X		X		X	X		
Direct disclosure proxy – corporate website	**AF**	**AFA**	**Quoted**	**Time-weighted**	**Effec-tive**	**Depth-adjus-ted**	**ST**	**PI**	**SPV**	**PIN**
Aerts *et al.* (2007)	X	X								
Trabelsi *et al.* (2008)		X								
Chang *et al.* (2008)				X						
Orens *et al.* (2010)			X				X			
Gajewski and Li (2015)			X	X	X					X

Notes: AF = analyst following; AFA = analyst forecast accuracy; ST = share turnover; PI = price impact; SPV = share price volatility; PIN = probability of informed trading

As it is evident from Table 6.1, a number of studies have used more than one proxy for information asymmetry (e.g. Orens *et al.*, 2010; Ajina *et al.*, 2015; Gajewski & Li, 2015; Fu *et al.*, 2012). For reasons, as discussed below, the following proxies, as listed in Table 6.1, were not used in this study: analyst forecast accuracy (AFA), time-weighted average spread, effective spread, depth-adjusted effective spread, and probability of informed trading (PIN).

Analyst forecast accuracy is based on analyst forecast dispersion. At least two analyst forecasts are needed to calculate this proxy and, as only 30 of the companies in the study sample are followed by two or more analysts, it was decided not to use this proxy. To calculate the time-weighted-, effective, and depth-adjusted effective spread, as well as the PIN, intraday data are needed. Given, firstly, the laborious nature of working with intraday data and, secondly, based on research that found similar results for alternative information asymmetry proxies (Gajewski & Li, 2015; Ajina *et al*., 2015), such intraday-based proxies were not used in this study.

Gajewski and Li (2015) studied the relationship between internet-based disclosure and information asymmetry. They used five proxies for information asymmetry (i.e. quoted spread, effective spread, time-weighted spread, PIN and adjusted PIN[177]) and found negative associations with disclosure for all five proxies. Ajina *et al.* (2015) found statistically significant negative relationships between both the quoted and the effective bid-ask spread, and their disclosure proxy (voluntary disclosure in annual reports).

This study has used the following five information asymmetry proxies: the quoted or relative bid-ask spread, price impact, share price volatility, share turnover, and analyst following. Data requirements for these proxies were captured from the INET BFA database. The bid-ask spread, price impact and share turnover proxies were calculated over the JSE trading days from 1 December 2014 to 30 November 2015. During this period, the JSE listing for three companies were suspended[178] and two companies were delisted[179]. For these companies, calculations were therefore adjusted to reflect the reduced trading days.

It was decided – based on an examination of the normal p-plots for the bid-ask spread, price impact and share price volatility – to use the natural logarithm (ln) of these proxies to reduce the skewness.[180] Various previous studies, for example Welker (1995), Leuz and Verrechia (2000) and Cheng *et al.* (2006), used similar transformations of their information asymmetry proxies. The five information proxies are now briefly discussed.

6.2.1 Bid-ask spread (BAS)

The relative or quoted bid-ask spread is the most frequently used proxy for information asymmetry. Being consistent with previous research (see Chapter 2), the quoted spread is calculated by means of the following formula:

$$\frac{Ask-Bid}{(Ask+Bid)/2} \tag{6.1}$$

[177] The adjusted PIN is based on a model developed by Duarte and Young (2009) to adjust for liquidity unrelated to information asymmetry.
[178] Evraz Highveld Steel & Vanadium Ltd, Firestone Energy Ltd and IPSA Group Plc.
[179] Fountainhead Property Trust and Infrasors Holdings Ltd.
[180] In an examination of the predicted values versus residuals scatterplots, as discussed later in this chapter, it was also found that using these transformed regression models improved the homoscedasticity of the regression results.

where:

Ask = lowest price at which a seller is willing to sell the share (also known as the offer price); and

Bid = highest price at which a buyer is willing to purchase the share.

The bid-ask spread was calculated using Formula 6.1 for each trading day between 1 December 2014 and 30 November 2015. The median bid-ask spread per company was then calculated.

As discussed in Section 2.4, the bid-ask spread is positively correlated with information asymmetry. A negative association between IIR and the bid-ask spread is therefore expected. Table 6.3 (page 193) shows that almost all studies to date have found such a negative association.[181]

6.2.2 Price impact (PI)

As discussed in Section 2.4.2, liquidity can be described using three dimensions: width (bid-ask spread), market depth and slippage (Kyle, 1985). Slippage, or market resilience (also referred to as price impact[182] or the illiquidity ratio[183]), captures the ability of an investor to trade in a share without affecting its price. Price impact as illiquidity ratio was developed by Amihud (2002).

Amihud (2002: 32) defined price impact as "the daily ratio of absolute stock return to its dollar volume". Fu *et al.* (2012) measured price impact as the yearly median of the daily absolute return divided by the dollar value of the trading volume. Being consistent with previous research, price impact is calculated by means of the following formula:

$$\frac{Daily\ absolute\ return}{Number\ of\ shares\ traded\ x\ Share\ price} \tag{6.2}$$

where:

$Daily\ absolute\ return$ = change in the closing market capitalisation between two trading days.

The price impact ratio was calculated for each trading day between 1 December 2014 and 30 November 2015 using Formula 6.2. The median price impact per company was then calculated over the trading days.

As discussed in Section 2.4, price impact is positively correlated with information asymmetry. A negative association between IIR and price impact is therefore expected.

As Table 6.6 (page 196) shows, empirical research to date has produced mixed results. For example, Fu *et al*. (2012) found a significant negative association between their disclosure proxy, namely

[181] The only exception in Table 6.3 is Orens *et al*. (2010). Although Orens *et al.* (2010) found the a negative association for their continental European sub-sample, they found no association between the bid-ask spread and their proxy for disclosure, namely corporate website non-financial performance disclosure, using northern American data.
[182] See Fu *et al.* (2012).
[183] See Ajina *et al.* (2015).

reporting frequency, and price impact using US data. However, Ajina *et al*. (2015), on the other hand, found no similar significant association using French data.[184]

6.2.3 Share price volatility (SPV)

Leuz and Verrechia (2000) argued that gradual changes in share prices (i.e. low levels of volatility) indicate lower levels of information asymmetry. Furthermore, private information revealed to the market causes price volatility (Cheng *et al.,* 2006). Ajina *et al.* (2015) argued that any change in share price following a change in investors' expectations will increase volatility. Share price volatility is also a well-known risk measure, with high volatility indicating high risk.

Share price volatility was captured from the INET BFA database (product called Market Data) as on 30 November 2015. INET BFA calculates share price volatility as the daily standardised deviation of share prices for the historic one-year period, multiplied by the square root of the number of trading days to annualise.

As discussed in Section 2.4, share price volatility is positively correlated with information asymmetry. A negative association between IIR and share price volatility is therefore expected.

As Table 6.6 (page 196) shows, empirical research to date has produced mixed results. For example, Cheng *et al.* (2006) found a significant negative association between their proxy for disclosure, namely voluntary annual report disclosure, and share price volatility using Singapore Stock Exchange data. However, Leuz and Verrechia (2000), on the other hand, found a significant positive association between their disclosure proxy, namely the switch from German to US GAAP, and share price volatility.

6.2.4 Share turnover (STO)

Share turnover captures the willingness of investors to trade. Following prior studies (Leuz & Verrechia, 2000; Cheng *et al*., 2006; Orens *et al.,* 2010; Agarwal *et al*., 2016), as discussed in Chapter 2, share turnover is calculated by means of the following formula:

$$\frac{Number\ of\ shares\ traded\ x\ Share\ price}{Market\ capitalisation} \qquad (6.3)$$

The share turnover ratio for each trading day between 1 December 2014 and 30 November 2015 was calculated using Formula 6.3. The average share turnover per company was then calculated over the trading days.

As discussed in Section 2.4, share turnover is negatively correlated with information asymmetry. A positive association between IIR and share turnover is therefore expected. As Table 6.5 (page 195) shows, empirical research to date has produced mixed results.

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[184] Ajina *et al.* (2015), however, did find significant (and the direction of coefficients as expected) associations for the other information asymmetry proxies used in their study: quoted bid-ask spread, share turnover and the effective bid-ask spread.

A significant positive association between disclosure and share turnover was found by both Leuz and Verrechia (2000) and Ajina *et al.* (2015). Orens *et al.* (2010), on the other hand, only found a significant positive association using continental European[185] data, with no significant association found using northern American[186] data. Cheng *et al.* (2006) found an unexpected significant negative association between disclosure and share turnover using Singapore Stock Exchange data.

6.2.5 Analyst following (AF)

Analyst coverage improves the information environment of a company and could therefore be associated with lower information asymmetry (Roulstone, 2003; Armstrong *et al.*, 2011; Aerts *et al.*, 2007).

According to Merton (1987), an effective investor relations programme may lower the cost of analyst information production, resulting in an increase in analyst following, which in turn will raise the company's profile with investors. Bhushan (1989: 262) argued that voluntary disclosure could either decrease the cost of gathering information, which would increase analysts' supply of information, or may be a substitute for the information that analysts could collect readily, thereby requiring the analyst to collect additional more costly private information.

Agarwal *et al.* (2016: 35) asserted that higher visibility as a result of an effective investor relations strategy would create a higher demand for analyst coverage. Agarwal *et al.* (2016: 35) found a significant positive association between analyst coverage and investor relations for smaller companies, but found no similar association for larger companies.

The number of analysts that are following each company was captured from the INET BFA database (product called Broker Consensus – Broker coverage per company) as at 1 December 2015. Analyst following is expected to be negatively correlated to the existence of information asymmetry, implying a positive association between IIR and analyst following.

As Table 6.6 (page 196) shows, empirical research to date has produced mixed results. Aerts *et al.* (2007) compared the association between disclosure and analyst following for a continental European[187] and northern American[188] sample and found the expected positive association for the northern American sample, but no significant association for the continental European sample.

6.3 PRIOR THEORETICAL DIRECTIONS OF RELATIONSHIPS AND MEASUREMENT

Although the purpose of this chapter was to test for the association between the level of IIR and information asymmetry, additional independent[189] variables that were used in the literature to explain variations in information asymmetry levels were identified and discussed in this section. Table 6.2

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[185] Belgium, France, Germany and the Netherlands.
[186] Canada and US.
[187] Belgium, France, Germany and the Netherlands.
[188] Canada and US.
[189] Referred to by some studies as explanatory or control variables.

shows the different proxies that were used in the literature for each of the independent variables discussed in this section. More specifically, this section discusses: (1) the underlying reasons used by literature to hypothesise the direction of relationships, (2) the results found in literature in terms of statistical significance and the economic sense of directions, (3) the direction hypothesised in this dissertation and finally, (4) a brief discussion of how each of these variables were measured in this dissertation.

Table 6.2: Proxies used in the literature to measure the determinants of information asymmetry

Variable	Proxy used
SHARE PRICE	Chang *et al.* (2008), Welker (1995); Healy *et al.* (1999); Heflin *et al.* (2005); Chi and Wang (2008); Ajina *et al.* (2015); Gajewski and Li (2015) (Welker calculate share price as the average bid and ask price on the last trading date of the year; Healy *et al.* (1999) use the logarithm of the share price, three months prior to the fiscal year-end; Chi and Wang (2008) use the natural logarithm of the annual average daily closing price; Ajina *et al.* (2015) use the average of the daily closing price)
LEVERAGE	Debt/Assets: Orens *et al.* (2010); Brown and Hillegeist (2007) Debt/Equity: Aerts *et al.* (2007)
SHARE PRICE VOLATILITY	Orens *et al.* (2010); Chang *et al.* (2008); Heflin *et al.* (2005); Chi and Wang (2008); Fu *et al.* (2012); Cheng *et al.(*2006); Ajina *et al.* (2015); Gajewski and Li (2015) (All studies use the standard deviation of the daily share price returns)
OWNERSHIP DISPERSION	Leuz and Verrechia (2000) use the free float percentage
OWNERSHIP CONCENTRATION	Cheng *et al.* (2006); Chang *et al.* (2008); Brown and Hillegeist (2007); Aerts *et al.* (2007); Orens *et al.* (2010) and Gajewski and Li (2015) (Orens *et al.* (2010) and Aerts *et al.* (2007) assigned a dummy variable of one for any single shareholding exceeding 20%; Gajewski and Li (2015) calculate the percentage of shares held by block owners (i.e. shareholdings exceeding 5%). Chang *et al.* (2008) and Brown and Hillegeist (2007) calculate the percentage of shares held by institutional investors; Cheng *et al.* (2006) assigned a dummy variable of one for the presence of an inside block owner (i.e. management or directors with shareholding exceeding 5%)
SHARE TURNOVER	Average daily number of shares traded: Chang *et al.* (2008); Chi and Wang (2008); Cheng *et al.* (2006); Ajina *et al.* (2015) Average daily dollar value of trading volume: Welker (1995) Logarithm of annual trading volume scaled by the number of issued shares: Healy *et al.* (1999) Value of shares traded scaled by the market capitalisation: Leuz and Verrechia (2000) and Fu *et al.* (2012) Average daily number of shares traded, scaled by the number of issued shares multiplied with the free-float percentage: Gajewski and Li (2015)
STOCK EXCHANGE LISTINGS	Orens *et al.* (2010); Ajina *et al.* (2015); Aerts *et al.* (2007) (Orens *et al.* (2010) and Aerts *et al.* (2007) assign weightings as follow: a weight of one and a half (1.5) for US or LSE listings and one for all other listings; Ajina *et al.* (2015) assign a dummy variable of one for US listing)

Tables 6.3 to 6.6 summarise the literature regression results – with Table 6.3 dealing with studies that have used the quoted bid-ask spread as information asymmetry proxy; Table 6.4 with analyst forecast accuracy and intraday-based proxies (e.g. effective and time-weighted spread); Table 6.5 with share turnover and Table 6.6 with price impact, share price volatility and analyst following. Prior theoretical directions and results discussed in Sections 6.3.1 to 6.3.6 are summarised in Tables 6.3 to 6.6. Tables 6.3 to 6.6 are available at the end of this section.

6.3.1 Share price (SP) (H2)

The microstructure of financial markets stipulates that the share price should explain liquidity (Ajina *et al*., 2015: 1228). According to Hearn and Piesse (2015: 6), the share price acts as a risk proxy with lower priced shares generally tending to be more risky than higher priced shares.

Significant negative associations were found between share price and the following information asymmetry proxies: (1) quoted bid-ask spread (Welker, 1995; Healy *et al.,* 1999; Ajina *et al*., 2015), (2) time-weighted spread (Chang *et al*., 2008) and (3) effective spread (Heflin *et al*., 2005; Ajina *et al*., 2015).

Ajina *et al.* (2015), on the other hand, found no significant association between share price and price impact. Gajewski and Li (2015) further found no significant association between share price and any of the five proxies[190] used for information asymmetry.

Table 6.2 shows that the literature varies significantly in respect of the calculation of the share price variable. Welker (1995), for example, calculated share price as the average bid-and-ask price on the last trading date of the year; Healy *et al*. (1999) used a three-month average; and Chi and Wang (2008) used an annual average of the daily closing share prices. Similar to Chi and Wang (2008), this study has used the annual average.

The daily closing share price for each company was captured from the INET BFA database (product called Market Data) for all trading days from 1 December 2014 to 30 November 2015. The average share price was then calculated for each company. As already discussed, the JSE listings for three companies were suspended[191] and two were delisted[192] during this period. For these companies, calculations were adjusted to reflect the available data.

Negative associations (H2-) were expected between the share price and each of the following: the bid-ask spread, price impact and share price volatility proxies. Positive associations (H2+) were expected between share price and each of the following: share turnover and analyst following proxies.

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[190] Quoted or relative bid-ask spread, effective spread, time-weighted spread, PIN and adjusted PIN.
[191] Evraz Highveld Steel & Vanadium Ltd., Firestone Energy Ltd. and IPSA Group Plc.
[192] Fountainhead Property Trust and Infrasors Holdings Ltd.

Some studies (such as Fu *et al.*, 2012) have used market capitalisation as independent variable rather than the share price; while one study (Ajina *et al.*, 2015) has used both. Orens *et al.* (2010) used total assets as size variable, but documented no significant association between total assets and either of the two proxies used for information asymmetry, namely the quoted bid-ask spread and share turnover.

Ajina *et al.* (2015) used both share price and market capitalisation as independent variables. Using the bid-ask spread as information asymmetry proxy, these authors found the expected negative association for share price, but no significant association was found for market capitalisation. Using share turnover as information asymmetry proxy, Ajina *et al.* (2015) found the expected negative association for share price, but, contrary to expectation, observed a significant positive association for market capitalisation. Muliticollinearity between share price and market capitalisation may explain these results.

Following Chang *et al.* (2008) and Gajewski and Li (2015), this study opted to use share price as independent variable. It should be noted that Chang *et al.* (2008) and Gajewski and Li (2015), as in the case of this study, measured corporate website disclosure.

6.3.2 Leverage (LEV) (H3)

Theoretical arguments are used in the literature to hypothesise positive and negative associations between leverage and information asymmetry. Aerts *et al.* (2007) and Boot and Thakor (1993) hypothesised a positive association, compared to Brown and Hillegeist (2007) that have expected a negative association.

Aerts *et al.* (2007: 1311) argued that as indebted companies rely less on equity markets, analysts will be less interested in such companies. A negative association between leverage and analyst following was therefore expected by Aerts *et al.* (2007). As analyst following is negatively correlated with information asymmetry, as discussed in Section 6.2.5, this equates to a positive association between leverage and information asymmetry, and therefore a positive association with information asymmetry proxies such as the bid-ask spread, price impact and share price volatility. Confirming their own reasoning, Aerts *et al.* (2007) found a significant negative association between analyst following and leverage using northern American data, but, on the other hand, they observed no significant association using continental European data.

Boot and Thakor (1993), as cited by Brown and Hillegeist (2007), argued that higher levels of leverage will stimulate private information production, which, as discussed in Section 2.4 and depicted in Figure 2.2, will increase information asymmetry.

On the other hand, Brown and Hillegeist (2007) argued that the pecking order theory of capital structure implies a negative association between leverage and information asymmetry. Brown and Hillegeist (2007) also found a significant negative association between leverage and their proxy for information asymmetry, namely the probability of informed trading (PIN).

One could however also use pecking order theory to argue a positive association between leverage and information asymmetry. According to the pecking order theory, companies will follow the route of least resistance when deciding on how to fund operations. Companies will therefore first use internal funds, then issue debt and lastly issue equity. Signalling theory, and specifically debt signalling and equity signalling theory, was discussed in Section 2.2. According to debt signalling theory, an increase in debt is a signal of financial stability and, according to equity signalling theory, companies will only issue debt if equity is overvalued. As discussed in Section 2.2, companies more often use signals in asymmetrical information environments. As such, the issue of debt (resulting in increased leverage) as signal can be associated with information asymmetry.

Further, leverage is a measure of financial risk, with risk being positively correlated with required returns. Based on theoretical arguments that information asymmetry is positively correlated with cost of equity (i.e. based on expected returns), a positive association between leverage and information asymmetry is expected.

In support of these arguments for a positive association, Orens *et al.* (2010) found a significant positive association between leverage and bid-ask spread and a significant negative association between leverage and share turnover in a full sample including both northern American and continental European companies. These associations were however driven by the northern American companies as they found no significant association between leverage and, by turn, the bid-ask spread and share turnover for the continental European companies. Similar non-significant results for continental European countries compared to significant results for northern American countries were reported by Aerts *et al.* (2007), as discussed above.

As Table 6.2 shows, the debt/asset ratio (Orens *et al.*, 2010) and debt/equity ratio (Aerts *et al.,* 2007)) were used as proxy for leverage in the literature. This study has used the debt-to-asset ratio as proxy for leverage.

The debt-to-asset ratio was captured from the INET BFA database (product called Ratios–General).

INET BFA calculates the debt-to-asset ratio as follows:

$$\frac{Total\ debt}{Total\ assets} \tag{6.4}$$

A positive association (H3+) was expected between leverage and each of the following: the bid-ask spread, price impact and share price volatility. Negative associations (H3-) were expected between leverage and each of the following: share turnover and analyst following.

6.3.3 Share price volatility (SPV) (H4)

According to Orens *et al.* (2010: 1072), share price volatility results from disagreements between buyers and sellers, and can therefore be associated with the requirement of higher risk premiums, which, in turn, will increase the bid-ask spread. Share price volatility indicates the degree of

uncertainty or risk (Gajewski & Li, 2015) and can be used as a measure of the price risk that investors have to bear (Welker, 1995: 808).

Although the majority of the literature about disclosure and information asymmetry found a positive association between share price volatility, as independent variable, and the quoted bid-ask spread, as dependent variable (Orens *et al.*, 2010; Fu *et al.*, 2012; Leuz & Verrechia, 2000; Cheng *et al.,* 2006; Ajina *et al.*, 2015), some studies did not find any significant association (Welker, 1995; Gajewski & Li, 2015).

Although Ajina *et al.* (2015) found the expected positive association using bid-ask spread as information asymmetry proxy, they found no significant association when price impact was used as information asymmetry proxy. Fu *et al.* (2012) found a significant positive association between share price volatility, as independent variable, and price impact, as dependent variable.

As discussed in Sections 6.2.1 and 6.2.4 above, bid-ask spread and share turnover are respectively positively and negatively correlated with information asymmetry. If a positive association between share price volatility, as independent variable, and bid-ask spread, as dependent variable, is therefore expected, as discussed above, one will intuitively expect a negative association between share price volatility, as independent variable, and share turnover, as dependent variable.

However, according to Orens *et al.* (2010: 1072), share price volatility, as independent variable, is expected to show a positive association with share turnover due to the increased trading activities between informed and liquidity traders. In support of their argument, a significant positive association between share price volatility, as independent variable, and share turnover, as dependent variable, were reported by studies such as Orens *et al.* (2010), Leuz and Verrechia (2000), Cheng *et al.* (2006), and Ajina *et al.* (2015).

Bhushan (1989: 271) found a positive association between share price volatility and analyst coverage, suggesting that the demand for analysts' services is higher for companies with a higher risk, as measured by share price volatility.

Share price volatility was captured from the INET BFA database (product called Market Data) as on 30 November 2015. INET BFA calculates share price volatility as the daily standardised deviation of share prices for the historic one-year period, multiplied by the square root of the number of trading days to annualise. Based on the discussions in this section, and previous research results, positive associations (H4+) between share price volatility and the following information asymmetry proxies were expected: bid-ask spread, price impact, share turnover and analyst following.

6.3.4 Ownership structure (F.FLT and DIR.SH (H5 and H6))

As discussed in Section 2.4 and depicted in Figure 2.2, information asymmetry is interrelated with the extent to which privately informed trading takes place and private information search activities. Large institutional investors not only have the resources to generate private information, but also

benefit from economies of scale – which will further decrease their information acquisition cost relative to smaller retail investors. According to Orens *et al.* (2010: 1072) and Leuz and Verrechia (2000), large shareholders (e.g. institutional shareholders) usually have greater access to corporate information, thus increasing the level of information asymmetry.

Two broad classes of ownership structure variables are used in the literature. The first is a measure of concentrated ownership. Examples are Orens *et al.* (2010), who assigned a dummy variable of one for any single shareholding exceeding 20%; Chang *et al.* (2008), who calculated the percentage of shares held by institutional owners; and Gajewski and Li (2015), who calculated the percentage of shares held by block owners (defined as shareholdings exceeding 5%).

The second is an inverse proxy for the presence of insiders, for example the free float percentage. The free float percentage measures the ratio between total issued shares minus restricted shares, scaled to total issued shares.[193] Restricted shares (i.e. locked-in shares or shares not readily available for trade) are defined by the JSE ground rules document (JSE 2016b) and include shareholdings such as shares held by the government, shares held by directors, senior executives and managers, employee share schemes and shares held by public companies. Leuz and Verrechia (2000: 109) used free float as an inverse proxy for the presence of insiders, with a hypothesised negative relationship between free float and information asymmetry. Confirming their own reasoning, Leuz and Verrechia (2000) found a significant negative association between free float and both the bid-ask spread and share price volatility proxies, as well as the expected positive association between free float and share turnover.

Orens *et al.* (2010) found a significant positive association between ownership concentration and the bid-ask spread and a significant negative association between ownership concentration and share turnover, but only for continental European countries, with no significant association for northern American countries.

In a similar vein and in further support of the argument above (positive association between concentrated ownership and information asymmetry), Aerts *et al.* (2007) found no significant association between concentrated ownership and analyst following for northern American companies, and a negative association for their continental European sample. Based on their empirical findings, Aerts *et al.* (2007) argued that, if ownership is concentrated, information is likely to be communicated through private information channels, thus decreasing the role of analysts.

On the other hand, Cheng *et al.* (2006) found no significant association between their proxy for concentrated ownership[194] and any one of the three proxies that they used for information asymmetry, namely quoted bid-ask spread, share turnover, and share price volatility. Gajewski and

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193 $\frac{Issued\ shares - Restricted\ shares}{Issued\ shares}$

194 Dummy variable of one for inside block ownership, defined as management or director(s) with shareholding exceeding 5% and classified as one of the top five shareholders in the annual report.

Li (2015) found no association between concentrated ownership and information asymmetry for three of the five proxies that they used for information asymmetry, namely quoted bid-ask spread, effective bid-ask spread, and probability of informed trading (PIN). For the other two information asymmetry proxies, namely time-weighted spread and an adjusted PIN, they did find the expected positive association.

Contrary to the results of Gajewski and Li (2015), Brown and Hillegeist (2007) found a significant negative association between concentrated ownership and PIN. Brown and Hillegeist (2007) argued that these findings were consistent with the heterogeneity among institutional investors, where some institutional investors would trade on private information as informed investors, and others as uninformed investors. Further, according to Brown *et al.* (2004: 357) the association between institutional ownership (i.e. concentrated ownership) and information asymmetry would fluctuate from quarter to quarter. Based on these arguments, Brown and Hillegeist (2007) argued that the relationship between institutional ownership and information asymmetry was unclear.

This study has used two ownership structure proxies, one for dispersed ownership (free float) and one for concentrated ownership (directors' shareholding). Free float was captured from a spreadsheet received directly from a JSE representative. The directors' shareholder percentage[195] was captured from INET BFA (product called Financial Statements under Sundry Data).

Based on the discussions above, the following associations were expected:

- Negative associations between free float and each of the following: the bid-ask spread, price impact and share price volatility (H5-)
- Positive associations between directors' shareholding and each of the following: the bid-ask spread, price impact and share price volatility (H6+)
- Positive associations between free float and each of the following: share turnover and analyst following (H5+)
- Negative associations between directors' shareholding and each of the following: share turnover and analyst following (H6-)

6.3.5 Share turnover (STO) (H7)

Trading volume consists of both informed and uninformed trading. As discussed in Section 2.4 and depicted in Figure 2.2, it can be hypothesised that informed trading increases information asymmetry and uninformed trading decreases information asymmetry. Ajina *et al.* (2015) have argued that increased levels of trading volume may cause disequilibrium in the market, resulting in extra costs that have to be recouped by the enlargement of the spread.

[195] INET BFA defines the directors' shareholder percentage as the number of shares held by the directors of the company, whether direct or indirect, beneficially or non-beneficially.

Although the relationship between share turnover and information asymmetry is therefore somewhat ambiguous, the majority of studies to date found a negative association between share turnover, as independent variable, and information asymmetry, as dependent variable.

A significant negative association was reported between share turnover, as independent variable, and each of the following: the bid-ask spread (Ajina *et al*., 2015; Gajewski & Li, 2015), price impact (Fu *et al*., 2012; Ajina *et al*., 2015), effective spread (Gajewski & Li, 2015), time-weighted spread (Chang *et al*., 2008), and the probability of informed trading (PIN) (Gajewski & Li, 2015).

To be consistent with the literature, this study calculated share turnover (STO) as the rand value of the trading volume scaled by the market capitalisation using the following formula:

$$\frac{Number\ of\ shares\ traded\ x\ Share\ price}{Market\ capitalisation} \tag{6.5}$$

Market capitalisation and the rand value of the trading volume (number of shares traded multiplied by share price) were captured from the INET BFA database (product called Market Data). The share turnover ratio was calculated for each trading day between 1 December 2014 and 30 November 2015. The average share turnover per company was then calculated.[196]

Based on the discussions in this section, and previous research results, negative associations (H7-) between share turnover and the bid-ask spread, price impact and share turnover were expected. Analysts would be attracted to more visible companies. A positive association (H7+) between share turnover, as independent variable, and analyst following as information asymmetry proxy, was therefore expected.

6.3.6 Stock exchange listings (LIST.D) (H8)

Multiple stock exchange listings are often associated with increased transparency and increased disclosure (Orens *et al*., 2010: 1070). Ajina *et al.* (2015: 1229) have argued that the compliance of the disclosure requirements associated with a US listing is perceived by investors as a positive signal, resulting in increased liquidity and decreased levels of information asymmetry.

Ajina *et al.* (2015) found a significant negative association between having a US listing and the quoted bid-ask spread, price impact and the effective spread. In further support of a negative association between having a dual listing and information asymmetry, these authors also found a significant positive association between having a US listing and share turnover.

A foreign listing may further stimulate analyst activity in the foreign country, as foreign investors will experience more information asymmetry compared to domestic investors, thereby creating a demand for analyst research in the foreign country (Aerts *et al*., 2007: 1311). Aerts *et al.* (2007)

[196] As discussed earlier in this chapter, the JSE listing of three companies were suspended and two were delisted during this period. Calculations were therefore adjusted accordingly.

found a significant positive association between their foreign listing proxy[197] and analyst following using continental European data, but failed to find a similar association using data from northern American countries.

Although using a different information asymmetry proxy (i.e. bid-ask spread), Orens *et al.* (2010), similarly to Aerts *et al.* (2007), compared continental European and northern American countries. Contrary to the findings of Aerts *et al.* (2007), Orens *et al.* (2010) found the expected negative association for northern American countries, but found no association for continental European countries.

For the purpose of this study, a dummy variable of one was assigned for companies with a dual stock exchange listing. The listing status of companies was captured from a spreadsheet received directly from a JSE representative. Based on the discussions in this section, and previous research results, a negative association (H8-) was expected between having a dual listing and the bid-ask spread, price impact and share price volatility. On the other hand, a positive association (H8+) was expected between having a dual listing and share turnover and analyst following.

[197] Aerts *et al.* (2007) assigned a weight of one-and-a-half for a US or LSE listing and one for all other listings.

Table 6.3: Information asymmetry (quoted bid-ask spread) studies: regression results

	Orens *et al.* (2010)			Welker (1995)	Healy *et al.* (1999)	Fu *et al.* (2012)	Leuz and Verrechia (2000)	Cheng *et al.* (2006)	Ajina *et al.* (2015)	Gajewski and Li (2015)
Country	**CE+NA**	**CE**	**NA**	**US**	**US**	**US**	**Germany**	**Singapore**	**France**	**France**
Adjusted R^2 (%)	27.9	31.5	23.6	62.6	28.4	42.9	80.5	84.7	73.6	59.5
Disclosure	***	***	#	***	*	***	**	**	***	***
Size variable	#	#	#		***	***	***	***	#	
Share price				***	***				***	#
Leverage	**	#	***							
Number of listings	**	#	**						***	
Share price volatility	***	***	***	#		***	***	***	***	#
Concentrated ownership	***	***	#					#		#
Dispersed ownership							***			
Share turnover				***	#	***	***	***	***	***
Hi Price[198]				***						
Low Price[199]				***						
SEPT11[200]								#		
IFRS[201]									***	

Table notes: ***,** and * represents statistically significant **negative** associations at respectively the 1% (***), 5% (**) and 10% (*) levels; ***,** and * represents statistically significant **positive** associations at respectively the 1% (***), 5% (**) and 10% (*) levels; # no statistically significant association; CE = Continental Europe; NA = North America; US = United States

[198] Welker (1995) assigned a dummy variable of one if the company mean share price is greater than $100
[199] Welker (1995) assigned a dummy variable of one if the company mean share price is less than $12.50
[200] Dummy variable used to control for the global financial markets effects induced by attacks on the US in 2011
[201] Dummy variable used to control for IFRS implementation

Table 6.4: Information asymmetry (effective and time-weighted spread, PIN and analyst forecast accuracy): regression results

	Gajewski and Li (2015)				Brown and Hillegeist (2007)	Chang *et al.* (2008)	Heflin *et al.* (2005)	De La Brusleri and Gabteni (2011)	Aerts *et al.* (2007)	Trabelsi *et al.* (2008)	Ajina *et al.* (2015)
	Effec-tive	**Time-weigh-ted**	**PIN**	**Adjus-ted PIN**	**PIN**	**Time-Weigh-ted**	**Effec-tive**	**Analyst forecast accuracy**	**Analyst forecast accuracy**	**Analyst forecast accuracy**	**Effec-tive**
Adjusted R^2 (%)	59.9%	49.9%	25.2%	34.8%	41.2%	83.8%	45.9%				71.6%
Disclosure	***	***	***	*	***	#	**				***
Size variable					***		***				***
Share price	#	#	#	#		***	***				*
Leverage					***						
Number of listings											***
Share price volatility	#	#	#	#		***	***				***
Concentrated ownership	#	*	#	***	**[202]						
Dispersed ownership											
Share turnover	***	***	***	***		***	***[203]				***
Analyst following					#						
Analyst forecast dispersion					***						
Earnings volatility					**						
IFRS implementation											***

Table notes: ***,** and * represents statistically significant **negative** associations at respectively the 1% (***), 5% (**) and 10% (*) levels; ***,** and * represents statistically significant **positive** associations at respectively the 1% (***), 5% (**) and 10% (*) levels; # no statistically significant association

[202] Calculated as the percentage of shares owned by institutional investors. Institutional investors were not defined in the study.

[203] Two separate independent variables were used, trade size (average number of shares traded per transaction x average share price) and trade frequency (average number of times shares trade per day) – both were reported statistically significant and negative

Table 6.5: Information asymmetry (share turnover) studies: regression results

	Orens *et al.* (2010)			Leuz and Verrechia (2000)	Cheng *et al.* (2006)	Ajina *et al.* (2015)
Country	**CE+NA**	**CE**	**NA**	**Germany**	**Singapore**	**France**
Adjusted R^2 (%)	43.7	35.4	38.2	34.3	30.4	53.7
Disclosure	**	***	#	**	*	***
Size variable	#	#	#	#	**	***
Share price						***
Leverage	***	#	***			
Stock exchange listings	#	*	*			***
Share price volatility	***	***	***	**	***	***
Concentrated ownership	***	***	#		#	
Dispersed ownership				***		
SEPT11[204]					#	
Asset growth					***	
Index inclusion[205]					**	
IFRS[206]						#

Table notes: ***,** and * represents statistically significant **negative** associations at respectively the 1% (***), 5% (**) and 10% (*) levels. ***,** and * represents statistically significant **positive** associations at respectively the 1% (***), 5% (**) and 10% (*) levels; # no statistically significant association; CE = Continental Europe; NA = North America; US = United States

[204] Dummy variable used to control for the global financial markets effects induced by attacks on US in 2011
[205] Dummy if company is included in the most widely followed index in Singapore (Straits Times Index)
[206] Dummy variable used to control for IFRS implementation

Table 6.6: Information asymmetry (price impact, share price volatility and analyst following) studies: regression results

	Price Impact (PI)		**Share price volatility (SPV)**		**Analyst following**	
	Fu *et al.* (2012)	**Ajina *et al.* (2015)**	**Leuz and Verrechia (2000)**	**Cheng *et al.* (2006)**	**Aerts *et al.* (2007)**	
Country	**US**	**France**	**Germany**	**Singapore**	**CE**	**NA**
Adjusted R^2 (%)	35.38%	67.2%	18.3%	14.0%	55.9%	27.5%
Disclosure	***	#	*	**	#	***
Size variable	***	***	**	**	***	***
Share price		#				
Leverage					#	*
Number of listings		***			***	#
Share price volatility	***	#				
Concentrated ownership				#	*	#
Dispersed ownership			**			
Share turnover	***	***				
SEPT11[207]				#		
IFRS[208]		***				
Beta factor			***	**	***	**
Market-to-book					***	**

Table notes: ***,** and * represents statistically significant **negative** associations at respectively the 1% (***), 5% (**) and 10% (*) levels. ***,** and * represents statistically significant **positive** associations at respectively the 1% (***), 5% (**) and 10% (*) levels; # no statistically significant association; CE = Continental Europe; NA = North America; US = United States

6.4 METHOD OF STATISTICAL ANALYSIS

As in Chapter 5 (as discussed in Section 5.4), the stepwise regression method was used to address the fourth research objective in this study, namely to examine the relationship between IIR and information asymmetry. As discussed, five alternative information proxies have been used in this study. Table 6.7 reviews the calculation of these proxies, as discussed in Section 6.2.

[207] Dummy variable used to control for the global financial markets effects induced by attacks on US in 2011
[208] Dummy variable used to control for IFRS implementation

Table 6.7: Description of the information asymmetry proxies used in this study

Information asymmetry proxy	Description
Bid-ask spread (BAS)	Natural logarithm of the median daily (over 250 trading days) of the difference between the last offer or ask (selling price) and last bid (buying price) scaled by the daily average of the last offer and last bid price
Price impact (PI)	Natural logarithm of the median daily (over 250 trading days) of the absolute daily return scaled by the daily rand value of shares traded
Share price volatility (SPV)	Natural logarithm of the annualised share price volatility as on 30 November 2015
Share turnover (STO)	Average daily (over 250 trading days) of the rand volume of shares traded scaled by the daily market capitalisation
Analyst following (AF)	The number of analysts following the company, i.e. the number of analysts that issue e.g. earnings per share forecasts per company as available on the INET BFA database

Besides, the IIR score, additional explanatory variables as used in the literature to explain variations in information asymmetry levels were discussed in Section 6.3. These are the variables that were used in each of the stepwise regression models in this chapter as applicable. Table 6.8 summarises the calculation of these variables for this purpose of the study.

Table 6.8: Independent variables used in the stepwise regression models of information asymmetry

Acronym	Variable	H	Description
Independent continuous variables			
IIR	Internet investor relations	1	Internet investor relations (IIR) score per company
SP	Share price	2	Natural logarithm of the average daily (over 250 trading days) closing share price
LEV	Leverage	3	Ratio between debt and assets
SPV	Share price volatility	4	Natural logarithm of the annualised share price volatility as on 30 November 2015
F.FLT	Free float percentage	5	Ratio between the total issued shares minus restricted shares to the total issued shares
DIR.SH	Directors' shareholding percentage	6	The percentage of direct and indirect, beneficial and non-beneficial shareholding of directors
STO	Share turnover	7	Average daily (over 250 trading days) of the rand volume of shares traded scaled by the daily market capitalisation
Independent categorical variable			
LIST.D	Dual listing	8	Dummy variable representing one if the company is dually listed on the JSE or any other stock exchange, and zero if otherwise

The expected associations between the independent variables, as listed in Table 6.8, and each of the information asymmetry proxies, as listed in Table 6.7, are summarised in Table 6.9.

It should be emphasised that the bid-ask spread (BAS), price impact (PI) and share price volatility (SPV) proxies are all expected to be positively correlated with information asymmetry. Share turnover (STO) and analyst following (AF), however, measure the inverse of information asymmetry and are therefore expected to be negatively correlated with information asymmetry. This explains the expected negative association between IIR and the bid-ask spread (BAS), price impact (PI) and share price volatility (SPV), as opposed to the expected positive associations between IIR and share turnover (STO) and analyst following (AF).

Table 6.9: Expected associations between information asymmetry proxies and independent variables

	Information asymmetry proxies				
	Bid-ask spread	**Price impact**	**Share price volatility**	**Share turnover**	**Analyst following**
Independent variables					
Internet investor relations (IIR)	-	-	-	+	+
Share price (SP)	-	-	-	+	+
Leverage (LEV)	+	+	+	-	-
Share price volatility (SPV)	+	+		+	+
Free float (F.FLT)	-	-	-	+	+
Directors' shareholding (DIR.SH)	+	+	+	-	-
Share turnover (STO)	-	-	-		+
Dual listing (LIST.D)	-	-	-	+	+

As discussed in Section 2.8, various studies to date have cautioned that disclosure, and therefore IIR, should be treated as an endogenous variable when studying the effects of voluntary disclosure on each of the following: information asymmetry (Chapter 6), the cost of debt (Chapter 7) and the cost of equity (Chapter 8). If not accounted for, the endogeneity problem will result in spurious results and incorrect conclusions. The Wu-Hausman test was therefore used to test for this potential endogenous problem. The results thereof are discussed in Section 6.5.

6.5 RESULTS

As a result of extremely thin trading, the bid-ask spread was not available for one company, as this company's shares only traded for 40 days in the measurement period. The sample was therefore reduced to 84 companies. All the results reported in this chapter are therefore applicable to this reduced sample.

6.5.1 Selected descriptive statistics

The descriptive statistics are set out in Table 6.10. As discussed in Sections 6.2 and 6.3, the natural logarithm (ln) of some of the dependent and independent variables was used to reduce the

skewness. The descriptive statistics for these variables (i.e. bid-ask spread, price impact, share price volatility and share price) are presented prior to their natural logarithmic transformations, which were used in the multivariate regression analysis.

Table 6.10: Descriptive statistics: variables used to examine variations in information asymmetry

Panel A: Dependent variables							
	Average	**Minimum**	**Quartile**			**Maximum**	**Standard deviation**
			Q1	**Q2**	**Q3**		
Bid-ask spread (BAS)	0.0472	0.0011	0.0028	0.0065	0.0394	0.4783	0.0876
Price impact (PI)	254.60	2.96	7.36	21.11	125.49	3 540.92	626.75
Share price volatility (SPV)	51.40	17.68	26.23	35.16	57.24	455.89	54.74
Share turnover (STO)	0.0015	0.00003	0.0004	0.0012	0.0022	0.0049	0.0012
Analyst following (AF)	2.31	0	0	1	3	11	3.33
Panel B: Continuous independent variables							
	Average	**Minimum**	**Quartile**			**Maximum**	**Standard deviation**
			Q1	**Q2**	**Q3**		
Internet investor relations (IIR)	98.70	13.50	69.25	96.25	130.63	193.50	42.73
Share price (SP) (ZAR)	R65.79	R0.03	R4.04	R18.89	R111.46	R696.21	R102.40
Leverage (LEV)	0.45	0.00	0.28	0.40	0.61	1.21	0.24
Share price volatility (SPV)	51.40	17.68	26.23	35.16	57.24	455.89	54.74
Free float % (F.FLT)	59.43	2.50	36.00	60.00	87.50	100	28.70
Directors' shareholding % (D.SH)	13.93	0.00	0.09	2.80	23.23	81.79	20.58
Share turnover (STO)	0.0015	0.00003	0.0004	0.0012	0.0022	0.0049	0.0012
Panel C: Categorical independent variables							
	1	0	Total				
Dual listing	25	59	84				

The results in Table 6.10 underline the significant variation between the companies included in the sample and support the objective of the sample selection criteria followed in Chapter 4, namely to select a sample that would ensure significant cross-sectional variation.

6.5.2 Correlation analysis

Table 6.11 shows the Pearson correlation coefficients between the five information asymmetry proxies (as discussed in Section 6.2) and the independent variables (as discussed in Section 6.3).

For the convenience of the reader, correlation coefficients in Tables 6.11 significant at the 1% or better level are printed in **green**, those at 5% or better in **blue**, and finally those at the 10% or better level in **red**. For log transformed variables, the correlation coefficient depicts the correlation with the natural logarithm of the variables, as applicable.

Table 6.11: Correlation matrix: information asymmetry and independent variables

	Dependent variables				
	Bid ask spread	**Price impact**	**Share price volatility**	**Share turnover**	**Analyst following**
Independent variables					
Internet investor relations (IIR)	**-0.64**	**-0.57**	**-0.33**	**0.50**	**0.57**
Share price (SP)	**-0.88**	**-0.79**	**-0.76**	**0.49**	**0.55**
Leverage (LEV)	**-0.26**	**-0.26**	**-0.25**	0.17	**0.24**
Share price volatility (SPV)	**0.79**	**0.74**	1.00	**-0.28**	**-0.25**
Free float (F.FLT)	**-0.50**	**-0.57**	**-0.31**	**0.65**	**0.34**
Directors' shareholding percentage (D.SH)	**0.35**	**0.35**	**0.20**	**-0.29**	**-0.26**
Share turnover (STO)	**-0.63**	**-0.76**	**-0.28**	1.00	**0.66**
Dual listing (LIST.D)	-0.09	0.05	0.09	-0.01	0.14

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

All the coefficients reported in Table 6.11 are as expected and as summarised in Table 6.9, except in three instances. Firstly, no significant association between dual listing (LIST.D) and any of the five information asymmetry proxies was found. Aerts *et al.* (2007) and Orens *et al.* (2010) also did not find any significant association between having multiple stock exchange listings and each of the following: analyst following (northern American data) and bid-ask spread (continental European data). As discussed in Section 6.5.3 below (see Table 6.14), dual listing was however found to be significant, and negative as expected, in the regression model where the bid-ask spread was used as information asymmetry proxy.

Secondly, a positive association between leverage and information asymmetry was expected, namely positive with the first three proxies (bid-ask spread, price impact and share price volatility) and negative with the last two (share turnover and analyst following). Table 6.11, however, depicts associations contrary to what were expected. As discussed in Section 6.3.2, theoretical arguments were used in the literature to hypothesise positive and negative associations between leverage and information asymmetry, and empirical results to date were mixed. Brown and Hillegeist (2007), for example, also found a significant negative association between leverage and information asymmetry.

The regression results reported in Table 5.9 (Section 5.5.3) may be used to explain the negative association between information asymmetry and leverage reported in Table 6.11. Table 5.9 shows a significant positive association between leverage, as independent variable, and IIR, as dependent variable. Table 6.11 further shows significant negative associations between IIR and the bid-ask spread, price impact and share price volatility, indicating a negative association between IIR and

information asymmetry.[209] The positive association between IIR and leverage, coupled with the negative association between IIR and information asymmetry, can therefore at least to some extent explain the negative association between leverage and information asymmetry.

Lastly, as discussed in Section 6.3.3 and depicted in Table 6.9, a positive association was expected between share price volatility, as independent variable, and share turnover and analyst following, as information asymmetry proxies. Although Table 6.11 depicts negative associations, significant and positive associations were found for both variables in the respective regression models, as discussed in Section 6.5.3 (see Table 6.14) below.

Table 6.12 displays the Pearson correlation coefficients between the independent variables that were used in the stepwise regression model to explain variations in information asymmetry levels. As with Table 6.11, **green** indicates 1% statistical significance, **blue** 5% and **red** 10%. The high correlations between share price (SP) and share price volatility (SPV), and free float (F.FLT) and share turnover (STO) send cautionary signals that tolerance (or variance inflation factors) should be carefully monitored for signs of multicollinearity.

Table 6.12: Correlation matrix: independent variables used to examine information asymmetry variations

	IIR	SP	LEV	SPV	F.FLT	DIR.SH	STO	LIST.D
Internet investor relations (IIR)	1.00							
Share price (SP)	**0.52**	1.00						
Leverage (LEV)	**0.36**	**0.29**	1.00					
Share price volatility (SPV)	**-0.33**	**-0.76**	**-0.25**	1.00				
Free float (F.FLT)	**0.39**	**0.39**	0.03	**-0.31**	1.00			
Directors' shareholding (DIR.SH)	**-0.31**	**-0.26**	-0.01	**0.20**	**-0.39**	1.00		
Share turnover (STO)	**0.50**	**0.49**	0.17	**-0.28**	**0.65**	**-0.29**	1.00	
Dual listing (List.D)	**0.26**	0.04	-0.11	0.09	-0.05	**-0.31**	-0.01	1.00

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

6.5.3 Regression estimation results

As discussed in Section 6.4, the Wu-Hausman test is used in this chapter to test for a potential endogenous problem. As discussed in Chapter 2, an instrumental variable is needed to perform the Wu-Hausman test. For the purpose of this chapter, as well as Chapters 7 (cost of debt) and 8 (cost of equity and cost of capital), being audited by a big four audit company was used as the instrumental variable. A dummy variable of one was assigned for all companies that were audited by a big four audit company.[210] As discussed and reported in Chapter 5, being audited by a big four audit company

[209] In a similar vein, the positive associations between IIR and both share turnover and analyst following depict a negative association between IIR and information asymmetry, given the inverse relationship between both share turnover and analyst following and information asymmetry.
[210] Deloitte & Touche, Ernst & Young, KPMG and PwC.

is highly significant and positively related to the endogenous independent variable, IIR, but is not correlated with information asymmetry.

The Wu-Hausman test also tests for the strength of the instrumental variable used. In all regression models reported in this chapter, the Wu-Hausman test confirmed the fit of this instrumental variable, as well as the absence of endogeneity. Similar results were found by Cheng *et al.* (2006) and Gajewski and Li (2015). The Wu-Hausman test results are showed in Table 6.13. For each of the test results showed in Table 6.13, the Ho hypothesis that IIR is an exogenous variable was tested. As the P-values in Table 6.13 indicate, none of these hypotheses were rejected and all four Ho hypotheses were therefore accepted, thus showing IIR is not an endogenous independent variable. The OLS regression model is therefore used in all further analyses in this chapter.

Table 6.13: Wu-Hausman results: IIR as independent variable and information asymmetry as dependent variable

Dependent variable	F	P-value
Bid-ask spread	0.069	0.79
Price impact	1.201	0.28
Share turnover	0.128	0.72
Analyst following	1.035	0.31

Table 6.14 presents the multivariate regression results of the stepwise regressions that were performed using the dependent and independent variables as listed and described in Tables 6.7 and 6.8 above. Using the full sample of 84 companies, the regression results showed that IIR is not a statistically significant independent variable to explain variations in share price volatility. No regression results are therefore reported for this information asymmetry proxy.

As in Tables 6.11 and 6.12, **green** indicates 1% statistical significance, **blue** 5% and **red** 10%. The regression results depicted in Table 6.14 are further discussed in Sections 6.5.3.1 to 6.5.3.5. Tolerance values were assessed for all regression models reported in Table 6.14 and the minimum tolerance value was 0.31 (i.e. the maximum variance inflation factor was 3.21). This indicates the absence of multicollinearity. The results of the Durbin-Watson statistics were all between 1.72 and 2.23, confirming the absence of autocorrelation.

Histograms of the raw residuals, as well as normality plots of residuals, were examined, and for all regression results reported here results suggest that residuals were approximately normally distributed with no influential outliers. Residual plots of predicted versus residuals were examined. From these residual plots no evidence of heteroscedasticity was found for the bid-ask spread and price impact model. The respective residual plots for share turnover and analyst following, however, both depict evidence of heteroscedasticity. The Breusch-Pagan test for heteroscedasticity confirmed the existence of heteroscedasticity in both regression models. The regression results reported in Table 6.14 is before adjustments were made for heteroscedasticity. Regression results, adapted for

heteroscedasticity, for the share turnover and analyst following regression model is discussed in Sections 6.5.3.4 and 6.5.3.5 below, but to summarise what follows – IIR remained significant in both regression models.

Table 6.14: Regression results: regression of information asymmetry proxies on IIR and other significant independent variables

	Bid-ask spread	Price impact	Share turnover	Analyst following
$\beta 0$	**-5.36**	0.68	**-0.003**	**-11.21**
Share price	**-0.61**	**-0.28**	**0.0004**	**1.468**
Share turnover	**-368.84**	**-840.77**		**1 133.06**
Share price volatility	**1.109**	**1.449**	**0.0004**	**1.50**
IIR	**-0.01**	**-0.004**	**0.000005**	**0.02**
Dual listed	**-0.26**			
Free float			**0.002**	
Adjusted R^2 (%)	91.18%	89.55%	51.19%	54.14%
F-value	172.57	178.84	22.759	25.49%
Durbin-Watson	2.23	2.19	1.72	1.72

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

6.5.3.1 Bid-ask spread

As discussed in Section 2.4.2.1 the bid-ask spread is the most popular information asymmetry proxy used in the literature. Of all the variations of the bid-ask spread used in the literature (e.g. quoted or relative, time-weighted relative, effective and depth-adjusted effective spreads), the quoted bid-ask spread is the most popular.

In the context of this study, adverse selection refers to the situation where buyers and sellers have different information. If IIR therefore decreases this adverse selection, it should result in a narrowing of the bid-ask spread.

As depicted in Table 6.14, the coefficient for IIR is negative and statistically significant at the 1% level. The coefficients of all other independent variables are as expected and highly significant (share price, share turnover and share price volatility), except for dual listing that is only significant at the 10% level. Although only significant at the 10% level, the negative association provides some evidence of one potential advantage for JSE-listed companies in having a dual listing, i.e. through a decrease in information asymmetry.

The negative IIR coefficient indicates that enhanced IIR reduces the level of the bid-ask spread, and therefore information asymmetry, which is in accordance with theoretical expectation and previous research. Although most studies to date that have found a similar negative association have used

either an indirect disclosure proxy (e.g. analyst ratings) or measured the annual report as disclosure vehicle, Gajewski and Li (2015) and Orens *et al.* (2010) have found the negative association based on a measurement of corporate website disclosure. Gajewski and Li (2015) used French data, while Orens *et al*. (2010) used northern American and continental European data.

On the other hand, Chang *et al.* (2008) found no significant association between spread and their measurement of the quality of a company's IIR activities. Chang *et al.* (2008: 386) suggested two possible reasons for this non-significant association:

- Website investor relations information may be perceived to be less credible by investors compared to annual report-provided disclosures; and
- A possible non-linear relationship between disclosure and spread, suggesting that that there may be an upper limit in the reduction of spread as disclosure quality improves.

To test their non-linear relationship argument, Chang *et al.* (2008) separately analysed high and low investor relations disclosing companies. Although both were non-significant, the authors found a negative association for low investor relations companies as opposed to a positive association for high investor relations companies.

Although the results are not reported in this study, a separate analysis and a comparison of the regression results of the 42 companies with low IIR scores (below median) with the 42 companies with high IIR scores (above median) showed some support for Chang *et al.* (2008). Though both IIR coefficients are negative, the IIR coefficient for the high IIR sample is only significant at the 10% level compared to the low IIR sample where the IIR coefficient is significant at the 5% level.

While Orens *et al.* (2010) found a negative association between website disclosure and the bid-ask spread using continental European data, they found no association using northern American data. They suggested two possible reasons for these conflicting results:

- Financial information quality in northern America is already sufficient to reduce information asymmetry; and
- There are differences in capital market properties which affect the information asymmetry proxies.

The magnitude of the reported adjusted R^2 of 91% compares favourably with studies such as Gajewski and Li (2015) reporting an adjusted R^2 of 60%; Welker (1995) reporting 63%; Ajina *et al.* (2015) reporting 74%; Leuz and Verrechia (2000) reporting 81%; and Cheng *et al.* (2006) reporting 85%.

6.5.3.2 Price impact

Liquidity can be described using three dimensions: width (bid-ask spread), market depth, and slippage (Kyle, 1985). Slippage (also referred to as market resilience) captures the ability of investors to trade in a share without affecting its price. The price impact ratio was developed by Amihud (2002)

to capture slippage. If IIR therefore increases liquidity and decreases information asymmetry, it should be negatively related to the price impact ratio as small changes in the share price will result in a lower price impact ratio.

As depicted in Table 6.14, the coefficient for IIR is negative and statistically significant, but only at the 10% level. The coefficients of all other independent variables are as expected and highly significant (share price, share turnover and share price volatility). The negative IIR coefficient indicates that enhanced IIR improves the ability of investors to trade in a share without affecting its price, resulting in increased liquidity levels and decreased information asymmetry.

Compared to the bid-ask spread as information asymmetry, few studies have used the price impact ratio as information asymmetry and empirical results are mixed. Fu *et al.* (2012), for example, found the expected negative association, whereas Ajina *et al.* (2015) found no significant association. Fu *et al.* (2012) used US data, while Ajina *et al.* (2015) used French data. Neither of these two studies however measured corporate website disclosure levels or investor relations levels. Fu *et al.* (2012) used an indirect disclosure proxy, namely financial reporting frequency, and Ajina *et al.* (2015) measured annual report voluntary disclosure levels.

Fu *et al.* (2012) reported an adjusted R^2 of 36% and Ajina *et al.* (2015) a higher 67%, but with a non-significant disclosure coefficient.

6.5.3.3 Share price volatility

Literature offers various reasons that may be used to explain variations in share price volatility, for example: private information revealed to the market (Cheng *et al.,* 2006), changes in investors' expectations (Ajina *et al.*, 2015), disclosure (Berton, 1994; Bushee & Noe, 2000; Kothari *et al.*, 2009), informed trading (Cheng *et al.*, 2006), and disagreements between buyers and sellers (Orens *et al.*, 2010).

The Financial Executives Institute (Berton, 1994) argued that increased disclosure levels will increase share price volatility. Bushee and Noe (2000: 200) reported results that suggest that the effect of disclosure on share price volatility depends on the type of investor attracted to the company (e.g. institutional or retail). Kothari *et al.* (2009) separately examined the effect of favourable and unfavourable disclosure on share price volatility. They found a positive association between unfavourable news and share price volatility.

Even though the association between disclosure and share price volatility is complex, share price volatility is a well-known risk measure and lower share price volatility levels may indicate lower levels of information asymmetry. The results of the stepwise regression model, however, found that IIR is not significant in explaining variations in share price volatility levels.

6.5.3.4 Share turnover

Share turnover captures the willingness of investors to trade and is therefore positively correlated with liquidity. However, as discussed in Section 2.4 and depicted in Figure 2.2, trading volume consists of both informed and uninformed trading. Figure 2.2 depicts that increased share turnover will only decrease information asymmetry if the relative amount of informed to uninformed trading is decreased. Cheng *et al*. (2006) found that informed trading increases bid-ask spreads and share turnover, while uninformed trading reduces spreads and increases share turnover.

According to Cheng *et al*. (2006), research by Beaver (1968), Winsen (1976) and Morse (1980) all suggest that trading volume increases with the degree of disagreement among investors (i.e. information asymmetry), therefore suggesting a positive correlation between share turnover and information asymmetry, which is contrary to the hypothesised negative relationship in this study.

Although the relationship between share turnover and information asymmetry is therefore somewhat ambiguous, it is often used in the literature as proxy for liquidity and information asymmetry (Orens *et al*., 2010; Leuz & Verrechia, 2000; Cheng *et al*., 2006; Ajina *et al*., 2015). Empirical research found both positive (Ajina *et al*., 2015), negative (Cheng *et al*., 2006) and no relationship (Orens *et al*., 2010) between disclosure and share turnover.

As depicted in Table 6.14, the coefficient for IIR is positive and statistically significant at the 5% level. The coefficients of all other independent variables are as expected and significant, although share price volatility only at the 10% level. Although various studies (see Table 6.5) have used share price volatility as independent variable in their regression models to explain variations in share turnover levels, a reverse causality relationship may exist between share turnover and share price volatility.

The Breusch-Pagan test confirmed the existence of heteroscedasticity. Adapted for heteroscedasticity, the IIR coefficient remained positive, but the level of statistical significance decreased to 10%. Share price volatility, however, was found non-significant ($p = 0.13$) in the regression results adapted for heteroscedasticity. The statistical significance of share price, however, increased to the 1% level in the adapted regression results.

If share price volatility as independent variable is removed from the regression model reported in Table 6.14, all remaining independent variables (share price, free float and IIR) are still significant and positive with only a slight decrease in the adjusted R^2 to 50% from the 51% reported in Table 6.14. These adjusted R^2 compares favourably with Orens *et al.* (2010) who reported an adjusted R^2 of 44% (full sample); Leuz and Verrechia (2000) who reported 34%; Cheng *et al.* (2006) who reported 30%; and Ajina *et al.* (2015) who reported 54%.

Easley *et al.* (1996) found a negative association between the probability of informed trading (PIN) and share turnover. The positive association between share turnover and IIR found here to some extent indicated a negative association between IIR and the probability of informed trading (PIN).

Trabelsi *et al.* (2008) questioned whether disclosure was an endogenous variable in stating that the companies with higher share turnovers were likely to be under more pressure to disclose additional information via corporate websites. Wu-Hausman test results (see Table 6.13), however, confirmed the absence of endogeneity and therefore rejected this reasoning by Trabelsi *et al.* (2008).

6.5.3.5 Analyst following

Analyst following is often used as proxy for the quality of a company's information environment (Orens *et al.*, 2010; Armstrong *et al.*, 2011; Aerts *et al.*, 2007). Based on the argument that an improved information environment decreases information asymmetry, analyst following can be used as information asymmetry proxy. Merton (1987) and Agarwal *et al.* (2016: 35) further argued that an effective investor relations programme increases analyst following.

Healy and Palepu (2001), on the other hand, argued that one can either reason that companies which disclose more information attract more analysts as these analysts are in a better position to create superior forecasts or that additional disclosure reduces the opportunities for analysts, implying a lower demand for their services leading to a lower analyst following.

Ettredge *et al.* (1999) further suggested that information disclosed on corporate websites varies systematically with the relative sophistication of companies' user bases. They specifically found that high levels of analyst following are associated with relatively objective and more extensive data compared to relatively subjective and more abbreviated information that is associated with higher levels of retail ownership.

Although the relationship between disclosure and analyst following is therefore not clear, a positive association was expected. Table 6.14 shows the expected positive association between IIR, significant at the 5% level, and analyst following. The coefficients of all other independent variables are as expected and significant.

The Breusch-Pagan test confirmed the existence of heteroscedasticity. Adapted for heteroscedasticity, the IIR coefficient remained positive with the level of statistical significance unchanged on 5%. In the adapted regression model, the statistical significance of the share price volatility variable, however, increased to the 1% level.

Orens *et al.* (2010: 1078) discussed a problem of endogeneity with the extent of disclosure. Orens *et al.* (2010) argued that either financial analysts are more likely to follow companies with more disclosure or companies may disclose more in order to attract more analysts. As discussed, the Wu-Hausman test results (see Table 6.13) confirmed the absence of endogeneity. Similar results (i.e. significant association between analyst following and Internet reporting, as well as the absence of endogeneity) were reported by Abdelsalam *et al.* (2007: 20).

6.6 SUMMARY AND CONCLUSION

The purpose of this chapter was to examine the relationship between IIR and information asymmetry through the use of a regression model to identify the determinants of information asymmetry. This section aims to answer each of the following questions briefly in order to conclude this chapter:

- What causes information asymmetry and why is it a problem?
- What are the underlying theoretical arguments in support of an association between disclosure and information asymmetry?
- What proxies did this chapter use for information asymmetry?
- To what extent do the empirical findings in this chapter provide further support or clash with empirical evidence and current theoretical thinking?
- What are the limitations of the methodology followed in this chapter and what further research should be undertaken to address these limitations?

6.6.1 Causes and negative effects of information asymmetry

Investors require information in order to evaluate investments. In view of both the costs and the skills required to gather information, not all investors are equally informed and this, in turn, may result in there being informed and uninformed investors. The separation of ownership (investors) and control (management), coupled with conflicting incentives between investors and managers, may further result in management having access to all the information available about the company and investors not. Information asymmetry may therefore exist between the management of a company and its investors, and/or between investors.

Akerlof (1970) first pointed out the negative effects of information asymmetry on the effective functioning of markets[211].

Among others, information asymmetry hinders the ability of investors to distinguish between good and bad investment opportunities (Healy & Palepu, 2001), creates additional costs through promoting adverse selection (Welker, 1995: 802; Leuz & Verrechia, 2000: 92) and decreases liquidity levels (Lev, 1988).

6.6.2 Prior theoretical arguments in support of an association between disclosure and information asymmetry

Brown and Hillegeist (2007) proposed two theories to explain why increased disclosure levels decrease information asymmetry. Theory 1 was based on the assumption that increased disclosure levels decrease private information search activities through the joint decrease of the available set of private information and the expected net benefits of searching for private information. Theory 2

[211]The Nobel Prize in Economics in 2001 was awarded jointly to Akerlof, Spence and Stiglitz for their analyses of markets with asymmetric information (Source: http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2001/index.html)

was based on the argument that increased disclosure levels attract more uninformed trading. Brown and Hillegeist (2007) admitted that increased uninformed trading would result in more informed trading, but suggested that, as informed traders are risk averse and capital constrained, the increase in uninformed trading would ultimately outweigh the increase in informed trading.

The investor recognition hypothesis provides further support for theory 2 in suggesting that uninformed investors are likely to invest in companies with which they are familiar. Based on the premise that a well-developed investor relations programme increases company visibility (Chang *et al*., 2008), increased IIR may increase uninformed trading and, through decreasing the probability of trading against a privately informed investor, results in a decrease in information asymmetry.

6.6.3 Proxies used in this chapter for information asymmetry

As information asymmetry is not directly observable, the use of proxies is called for. After an extensive literature review, proxies that were used in the literature were identified. The following five proxies were used in this study: bid-ask spread, price impact, share price volatility, share turnover, and analyst following.

The most popular proxy in the literature is the bid-ask spread. The bid-ask spread proxy is based upon the premise introduced by the Akerlof (1970) study that investors with less information price protect themselves by amending their bid (i.e. highest buy) and ask/offer (i.e. lowest sell) prices away from the market. The result is a widening in the bid-ask spread. Small bid-ask spreads are a characteristic of liquid markets (Black, 1971).

The price impact ratio was developed by Amihud (2002) and is based on the argument that, in liquid markets, investors should be able to trade without affecting the share price. Price impact is therefore a measure of illiquidity.

Although share turnover captures the willingness of investors to trade, trading volume consists of both informed and uninformed trading and, as discussed above, will only theoretically decrease information asymmetry if it simultaneously decreases the probability of trading with a more informed investor with private information.

Share price volatility is a well-known risk measure, and as all risk measures, positively correlated with expected returns (e.g. cost of equity). Expected returns are further theoretically linked to information asymmetry. Private information revealed to the market and disagreements between buyers and sellers – both characteristics of information asymmetry – further cause share price volatility.

Analyst following is often used as an indication of the quality of the company's information environment. Based on the assumption that increased analyst following improves the information environment, and further that an improved information environment equates to less information asymmetry, analyst following is a measure of information asymmetry.

6.6.4 Empirical findings in this chapter compared to prior empirical evidence and current theoretical thinking

Of the five proxies used for information asymmetry in this chapter, the bid-ask spread is not only the most popular and theoretically appealing proxy, but it also has the strongest empirical support for a negative association between disclosure and information asymmetry. The majority of studies about disclosure and information asymmetry have, however, been performed using developed country data and have either used analyst ratings as disclosure proxy or have measured the annual report as disclosure vehicle. This study therefore not only provides further empirical support for a negative relationship between disclosure and information asymmetry, but more specifically it provides support for the investor recognition hypothesis that states that a well-developed investor relations programme improves visibility and decreases information asymmetry. Specifically in respect of IIR, this study provides further support for the findings of Gajewski and Li (2015) who used a French sample, but contradicts the findings by Chang *et al.* (2008) who found no association using an Australian sample.

Although used far less as information asymmetry proxy, price impact seems to capture an important measure of liquidity, which is the ability of an investor to trade without affecting the share price. Empirical support for a negative association between disclosure and price impact is, however, weak and unstable. This study not only provides strong empirical support for a negative association between IIR and price impact, but also provides further support for the continuous use of price impact as illiquidity and information asymmetry proxy (based on the negative association found between IIR and the bid-ask spread in this dissertation).

Share price volatility, share turnover and analyst following are considered less precise measures of information asymmetry. As discussed in Section 6.5.3.3, there are opposing theoretical arguments and empirical research that support both positive and negative relations between share price volatility and information asymmetry. This study found no statistically significant association between share price volatility and IIR using multivariate stepwise regression, except for the significant negative Pearson correlation as shown in Table 6.12.

Although far from overwhelming, the weight of evidence provided by the literature favours a positive association between share turnover and disclosure. This study therefore adds further empirical support for such a positive association. Bearing in mind the conflicting arguments that share turnover may either increase or decrease information asymmetry, the negative associations between IIR and both the bid-ask spread and price impact found in this study suggest that the increased share turnover resulting from an enhanced IIR programme is mainly driven by uninformed trading. This provides further support for the investor recognition hypothesis.

The positive association between IIR and analyst following support the arguments by Merton (1987) and Agarwal *et al*. (2016) that an effective investor relations programme will increase analyst

following. This positive association, coupled with the negative association between IIR and both the bid-ask spread and price impact, strengthens the use of analyst following as proxy for the quality of a company's information environment, as suggested by Orens *et al*. (2010), Armstrong *et al*. (2011) and Aerts *et al*. (2007).

In theory, the bid-ask spread and price impact are positively related to information asymmetry, and share turnover and analyst following, negatively. The level of IIR was found to be statistically significantly and negatively related to the bid-ask spread and price impact, and positively related to share turnover and analyst following. Based on theory, the observed relationships – two negative; two positive – therefore all points towards a negative relationship between IIR and information asymmetry.

Finally, the Wu-Hausman test results indicate that companies are not likely to be under pressure to improve their IIR and to disclose more on corporate websites based on increased share turnover levels and analyst following, as suggested by Trabelsi *et al.* (2008) and Orens *et al. (*2010).

6.6.5 Limitations of this chapter and suggestions for further research

As discussed in Section 6.2, information asymmetry proxies based on intraday data were not used in this study. Research has found that the adverse selection component of the bid-ask spread is highest at the beginning of the day and lowest at the end of the day for all but the largest trades (Lin *et al.,* 1995). As this study has used the closing bid and closing ask prices at the end of each trading day to capture the bid-ask spread, the IIR coefficient reported in Table 6.14 may be an underestimate, if research that found a stronger negative relationship between disclosure and information asymmetry for high information asymmetry companies is considered (Brown & Hillegeist, 2007).

Market microstructure literature shows that spread contains three distinct components: order processing costs, adverse selection costs, and inventory holding costs (Ajina *et al.,* 2015). By using a spread decomposition model, the spread components can be estimated (Easley *et al*., 1996; Brown & Hillegeist, 2007). Brown and Hillegeist (2007) calculated the probability of informed trading (PIN) as information asymmetry proxy. According to Gajewski and Li (2015), PIN is a more precise measure of information asymmetry as it excludes the process costs (i.e. transaction costs) and inventory holding costs.

Research further shows that spread and the components of spread vary between trade sizes. Lin *et al*. (1995), for example, found that the average effective spread increases with trade size. As discussed in Section 2.4.2, liquidity can be described using three dimensions: width (bid-ask spreads), market depth, and slippage (Kyle, 1985). Market depth specifies the maximum number of shares for which the quoted bid and ask prices apply. To study the effect of market depth, Heflin *et al.* (2005) calculated the depth-adjusted spread, as discussed in Section 2.4.2.2.

Studies such as Gajewski and Li (2015) have found similar results between Internet-based disclosure and a variety of information asymmetry proxies, such as quoted bid-ask (as used in this study), time-weighted spread, and PIN. However, further research is needed to investigate the association between IIR and information asymmetry proxies, such as PIN and the depth-adjusted spread, as discussed in this chapter.

CHAPTER 7
COST OF DEBT

7.1 INTRODUCTION

The cost of debt is the cost at which a company may borrow money and can be defined as the risk-free rate plus the default risk. Garlappi, Shu and Yan (2008: 2743) defined default risk as "the likelihood that a levered firm will not be able to pay the contractual interest or principal on its debt obligations". Debt financing is an important source of external financing for listed companies. The average debt–asset ratio for the companies included in the study sample was calculated as 0.45 in Chapter 5 (see Table 5.5).

The purpose of this chapter is to examine the relationship between Internet investor relations (IIR) and the cost of debt. Besides debt, equity (i.e. shares issued and retained earnings) is the other important source of finance for companies. The cost of equity, as well as the weighted average cost of capital,[212] is discussed in Chapter 8.

Why would an enhanced policy of IIR decrease the cost of debt? As discussed in Chapter 2, the separation of ownership (investors) and control (management) results into information asymmetry between investors and management. Agency theory further assumes conflicting incentives between management and investors. In a similar vein, the separation between the providers of debt financing (hereafter referred to as creditors) and management results into information asymmetry and conflicting incentives between creditors and management.

One of the factors that influences the default risk calculation is the probability that the company is withholding important unfavourable information (Sengupta, 1998: 461). The larger this probability (as assessed by the creditors), the larger the risk premium (default risk) that is added to the risk-free rate. To reduce expropriation by managers, creditors introduce debt covenants and restrictions into debt contracts which result in higher agency costs and therefore higher cost of debt (Guidara *et al*., 2014: 151).

Increased disclosure and transparency through IIR, however, can decrease the assessed probability that companies withhold adverse private information. Signalling theory can also be used as possible explanation for a negative relationship between IIR and the cost of debt, in that a well-developed corporate website signals transparency, business success and therefore the ability of the company to repay its debts.

Using US data and analyst ratings as disclosure proxy, Sengupta (1998) and Nikolaev and Van Lent (2005) both found a negative association between disclosure and the cost of debt. Orens *et al.* (2010)

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[212] The weighted average cost of capital (WACC) is calculated as the weighted average of the cost of equity and the cost of debt. Weights are assigned based on the capital structure of the company, namely the sources of financing used in the business.

used a direct disclosure proxy with corporate websites as disclosure vehicle. Orens *et al.* (2010) found a similar negative association for their continental European[213] sub-sample, but no significant association for their northern American[214] sub-sample. Also using developed country data, this time South Korean data, Kim and Jeon (2015) examined the association between the implementation of the investor relations function in a company and corporate bond credit ratings. They found the expected positive association.

Francis *et al.* (2005) examined the relationship between disclosure and the cost of debt in a multicountry setting of 34 countries and included both developed and developing countries in their sample. Overall, Francis *et al*. (2005) found a significant negative association between disclosure and the cost of debt.

Using data from a developing country, Guidara *et al.* (2014) established a negative association between annual report voluntary disclosure and the cost of debt for a sample of South African listed companies. Also using developing country data (China), Wang *et al.* (2008) found no similar association.

Possible reasons for the mixed results may include: the disclosure proxy used, the proxy used for the cost of debt, country data used, and endogeneity. Regarding the measurement of disclosure, some studies used an indirect disclosure proxy such as analyst ratings (e.g. Sengupta, 1998; Nikolaev & Van Lent, 2005; Francis *et al*., 2005) or the implementation of the investor relations function (Kim & Jeon, 2015), as opposed to direct disclosure proxy studies that measured either the annual report (Guidara *et al*., 2014; Wang *et al*., 2008) or corporate websites as disclosure vehicle (Orens *et al*., 2010).

Proxies used for the cost of debt varied from the effective yield of maturity of bonds (Nikolaev & Van Lent, 2005; Sengupta, 1998), corporate bond credit ratings (Kim & Jeon, 2015) and the interest expense to debt ratio (Guidara *et al*., 2014; Orens *et al*., 2010; Wang *et al*., 2008).

Nikolaev and Van Lent (2004) and Orens *et al.* (2010) reported results that show a stronger negative relationship between disclosure and the cost of debt after controlling for endogeneity. Other studies, such as Guidara *et al.* (2014) and Wang *et al.* (2008), failed to either test or control for endogeneity.

Theoretically, a well-developed IIR programme can decrease creditors' assessed probability of the default risk, resulting in a decreased cost of debt. Although the weight of empirical evidence points to a negative association between disclosure and the cost of debt, literature is far from reaching a consensus. Furthermore, studies that used IIR as disclosure proxy or JSE-listed data were scarce. The fifth objective of the study, and the purpose of this chapter, is to examine the relationship

[213] Belgium, France, Germany and Netherlands.
[214] Canada and US.

between IIR and the cost of debt in a sample of JSE-listed companies. The remainder of this chapter is organised into five distinct sections as follows.

Firstly, Section 7.2 discusses the cost of debt proxies that were used in literature and concludes with how the cost of debt is measured in this study. Next, independent variables, besides IIR, that were used in the literature to explain variations in the cost of debt are discussed in Section 7.3. Section 7.4 then elaborates on the specific research methodology, including a discussion of how this study addressed endogeneity. In the last two sections, the results are discussed, and finally a summary and conclusion close the chapter.

7.2 COST OF DEBT MEASUREMENT

Guidara *et al.* (2014), Orens *et al.* (2010), Wang *et al.* (2008) and Francis *et al.* (2005a) have all measured the pre-tax cost of debt (CoD) using the following formula:

$$CoD = \frac{Interest\ expense\ for\ the\ year}{Short\ and\ long\ term\ liabilities} \tag{7.1}$$

Although both components of Formula 7.1 are disclosed in the financial statements of companies, the interest expense is disclosed in the statement of profit or loss and the liabilities in the statement of financial position. The interest expense is therefore the accrued expense for the year as opposed to liabilities that are the outstanding balance as at year end. Companies may be tempted to redeem interest-bearing liabilities such as bank overdrafts just before year end to improve the outlook of their financial statements.

Some studies have used the opening balance (i.e. at the beginning of the financial year) (Guidara *et al.*, 2014), while others have used the average balance (i.e. the average of the opening and the closing balances) (Francis *et al.*, 2005a) of liabilities as the denominator in the formula above. This study used the average of the short-term and long-term interest-bearing liabilities as denominator. Both the interest expense and the interest-bearing liabilities were captured from the INET BFA database. Following Guidara *et al.* (2014), Orens *et al.* (2010), Wang *et al.* (2008) and Francis *et al.* (2005), this study used the pre-tax cost of debt.

Compared to US companies that rely primarily on bond issues as source of external finance, listed companies in an African setting make use of financial institutions such as banks for their primary source of finance (Barako, Hancock & Izan, 2006). The use of alternative cost of debt proxies such as the yield to maturity and corporate bond credit ratings were therefore not applicable to the South African setting of this study.

The following formula is therefore used in this chapter to calculate the cost of debt:

$$CoD = \frac{Interest\ expense\ for\ the\ year\ before\ tax}{(Opening\ interest\ bearing\ debt + Closing\ interest\ bearing\ debt)/2} \tag{7.2}$$

7.3 PRIOR THEORETICAL DIRECTIONS OF RELATIONSHIPS AND MEASUREMENT

As discussed in Section 7.1, a negative association between IIR and the cost of debt is expected. In addition to the IIR score, additional explanatory variables, as used in the literature to explain variations in the cost of debt levels, are discussed in this section. Table 7.1 shows the different proxies that were used in the literature for each of the independent variables discussed in this section. More specifically, this section discusses: (1) the underlying reasons used by the literature to hypothesise the direction of relationships, (2) the results found in the literature in terms of statistical significance and the economic sense of directions, (3) the direction hypothesised in this dissertation and finally, (4) a brief discussion of how each of these variables were measured in this dissertation.

Table 7.1: Proxies used in literature to measure the determinants of the cost of debt

Variable	Proxy used
SIZE	Logarithm of total assets: Wang *et al.* (2008); Orens *et al.* (2010: 1071); Guidara *et al.* (2014: 155); Francis *et al.* (2005a); Sengupta (1996); Kim and Jeon (2015)
LEVERAGE	Debt/total asset: Orens *et al.* (2010: 1071) and Francis (2005a: 1150) Debt/equity ratio: Wang *et al.* (2008) Debt/market capitalisation: Sengupta (1998)
EPS VARIABILITY	Logarithm of the percentage change between two years: Orens *et al.* (2010: 1071) and Guidara *et al.* (2014: 155)
PROFITABILITY	Return on assets: Wang *et al.* (2008); Francis *et al.* (2005a) and Kim and Jeon (2015) Return of sales: Sengupta (1998) Dummy variable of one if the company reports a negative earnings in the latest financial year: Guidara *et al.* (2014: 155); Orens *et al.* (2010) and Kim and Jeon (2015)
INTEREST COVER	Sengupta (1998)

7.3.1 Size (SP) (H2)

Larger companies are expected to have a lower cost of debt, given their lower risk (Sengupta, 1998: 464). Kasozi (2009: 42) listed the following arguments in support of the notion that larger companies can afford to borrow greater amounts and more often than smaller companies are able to do: larger companies are well-established and have a greater diversified pool of assets; larger companies have less earnings volatility; and larger companies have lower levels of financial distress which enables them to carry more debt. All three arguments listed by Kasozi (2009) support the notion that larger companies should have both greater leverage and a lower cost of debt.

Empirical results are, however, mixed and the majority of disclosure–cost of debt studies did not find any significant relationship between size, as independent variable, and the cost of debt, as dependent variable (Orens *et al.*, 2010; Guidara *et al.*, 2014; Sengupta, 1998; Wang *et al.*, 2008). Francis *et al.* (2005a) found a negative association between size and the cost of debt, while Kim and Jeon (2015) found a positive association between size and credit bond ratings (which equates to a negative association with the cost of debt).

From an inspection of the pairwise Pearson correlation coefficients (not reported in this study) between IIR and market capitalisation (+0.65), total assets (+0.73) and the share price (0.51), it was decided to use the share price as size variable to avoid potential muliticollinearity. Although studies such as Francis *et al.* (2005a) found a significant negative association between both total assets and disclosure and the cost of debt, it should be noted that their reported Pearson correlation between disclosure and total assets was only +0.32 (raw disclosure score) and +0.24 (scaled disclosure score).

The daily closing share price for each company was captured from the INET BFA database (product called Market Data) for all trading days from 1 December 2014 to 30 November 2015. The average share price was then calculated for each company. As already discussed, the JSE listing for three companies was suspended[215] and two were delisted[216] during this period. For these companies calculations were adjusted accordingly to reflect the available data. A negative association between share price and the cost of debt was expected (H2).

7.3.2 Leverage (LEV) (H3)

The higher the financial leverage, the higher the probability that the company will default, increasing the default risk and therefore the cost of debt (Francis *et al*., 2005a: 1147). Research further found that larger companies borrow greater amounts and more regularly than smaller companies do (Kasozi, 2009: 30), and, as discussed in Section 7.3.1, a lower cost of debt is, *ceteris paribus,* expected for larger companies. Finance theory, however, states that although larger companies may be able to borrow money at a lower cost compared to smaller companies, this will only hold up to certain point. Excessive leverage beyond this point will increase the financial risk and therefore the cost of debt.

Although disclosure–cost of debt studies usually expect a positive association between leverage and the cost of debt, the relationship between leverage and the cost of debt is in fact more complex and may even be negative. For example, Orens *et al.* (2010) found no association between leverage and the cost of debt, while Francis *et al.* (2005a) and Sengupta (1998) both found positive associations, and Wang *et al.* (2008) found a negative association.

The debt–asset ratio (Francis *et al.*, 2005a), debt–equity ratio (Wang *et al.,* 2008)) and the debt–market capitalisation ratio (Sengupta, 1998) were used as proxies for leverage in the literature. This study used the debt to asset ratio as proxy for leverage. The debt to asset ratio was captured from the INET BFA database (product called Ratios-General).

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[215] Evraz Highveld Steel & Vanadium Ltd, Firestone Energy Ltd and IPSA Group Plc.
[216] Fountainhead Property Trust and Infrasors Holdings Ltd.

INET BFA calculates the debt to asset ratio as follows:

$$\frac{Total\ debt}{Total\ assets} \tag{7.3}$$

A positive association between leverage and the cost of debt was expected (H3).

7.3.3 Market-to-book value (MTB) ratio (H4)

As discussed in Section 5.3.5, the market-to-book (MTB) ratio is a proxy for future growth opportunities (Orens *et al.,* 2010: 1070; Celik *et al*., 2006) and companies with high MTB ratios are further expected to disclose more information (Trabelsi *et al*., 2008; Larrán & Giner, 2002: 67) in order to communicate or signal such growth opportunities to investors. If creditors agree with the positive growth outlook portrayed by a high MTB ratio, they may adjust the default risk and the cost of debt downward.

Orens *et al.* (2010) found a highly significant negative association between the MTB ratio using northern American data, but failed to find any similar association using continental European data.

The MTB ratio was captured from the INET BFA database (product called Ratios-General). INET BFA calculates the MTB ratio as the market value of a share divided by its book value. Book value per share is calculated as the ordinary shareholders' interest divided by the number of ordinary shares in issue.

A negative association between the market-to-book value (MTB) ratio and the cost of debt was expected (H4).

7.3.4 Earnings per share (EPS) variability (EPS VAR) (H5)

Given the increased risk in predicting the future earnings for companies with high earnings variability, creditors require a larger risk premium and therefore cost of debt for such companies (Orens *et al*., 2010: 1070). Orens *et al.* (2010) found a significant positive association between earnings per share variability, as independent variable, and the cost of debt for their continental European sample, but failed to find any association using northern American data. Guidara *et al.* (2010) also found no association using South African data.

This study used the natural logarithm of the standard deviation of the earnings per share growth over the last five years (i.e. four growth percentages) as proxy for the earnings per share variability. The annual EPS growth percentages were captured from the INET BFA database. INET BFA calculates the EPS growth rate using the following formula:

$$\frac{(Current\ headline\ EPS - previous\ headline\ EPS}{Previous\ headline\ EPS} * \frac{100}{1} \tag{7.4}$$

Owing to data limitations, the standard deviation for six companies were based on only three growth percentages and for two companies on only two. A positive association between the earnings per share variability (EPS VAR) and the cost of debt was expected (H5).

7.3.5 Profitability (ROE) (H6)

Companies with negative earnings are more difficult to analyse (Brown, 2001) as they tend to manipulate their earnings (Orens *et al*., 2010: 1070). Uncertainty regarding the future profitability of companies with negative earnings results in an upward adjustment by creditors of the default risk and therefore increases the cost of debt.

The greater uncertainty regarding the future profitability of companies with negative earnings increases the cost at which companies can borrow money (Orens *et al*., 2010: 1070). Sengupta (1998) calculated the profit margin as the income divided by the net sales and expected a negative association between the profit margin and the cost of debt.

Regarding the profitability variable, disclosure–cost of debt studies can be categorised into two groups: studies that have used some profitability ratio, for example the return on assets (Wang *et al*., 2008) or return on sales (Sengupta, 1998) and studies that have assigned a dummy variable of one to categorise companies that have reported a loss in the last financial year (Guidara *et al*., 2014; Kim & Jeon, 2015).

Guidara *et al.* (2014), Francis *et al.* (2005a) and Sengupta (1998) found no association between profitability and the cost of debt. Wang *et al.* (2008) found the expected negative association between profitability and the cost of debt using Chinese data. Orens *et al.* (2010), however, only found the expected positive association between their dummy variable assigned for loss-making companies and the cost of debt using North American data, with no similar association for their continental European sample.

This study used the return on equity (ROE) ratio as profitability proxy. The ROE ratio was captured from the INET BFA database (product called Ratios-General). INET BFA calculates ROE using the following formula:

$$\frac{Profit\ attributable\ to\ ordinary\ shareholders}{Ordinary\ shareholders'\ interest} \tag{7.5}$$

A negative association between the ROE and the cost of debt was expected (H6).

7.3.6 Interest cover (IC) (H7)

Interest cover is a calculation of a company's ability to meet its interest payments. The lower the interest cover, the larger the debt burden and the financial risk of the company, resulting in an increased default risk. Sengupta (1998) hypothesised a negative association between interest cover and the cost of debt, but failed to find any significant association.

The interest cover ratio was captured from the INET BFA database. INET BFA calculates interest cover using the following formula:

$$\frac{Earnings\ before\ interest\ and\ taxes}{Interest\ expense} \tag{7.6}$$

A negative association between interest cover and the cost of debt was expected (H7).

7.3.7 Dual listing (LIST.D) (H8)

Multiple stock exchange listings are often associated with increased transparency and increased disclosure (Orens *et al.*, 2010: 1070). A research report by Citibank (2011) found a significant negative association between the cross-border listing of shares via a depository receipt and the cost of debt. Ball, Hail and Vasvari (2013) examined the specific advantage of an equity cross-listing in the US and the cost of debt. Using a global sample of more than 40 countries (including South Africa), they found that companies do benefit from a lower cost of debt following a cross-listing in the US.

For the purpose of this study, a dummy variable of one was assigned for companies with a dual stock exchange listing. The listing status of companies was captured from a spreadsheet received directly from a JSE representative. A negative association between the dual listing dummy variable and the cost of debt was expected (H8).

7.4 METHOD OF STATISTICAL ANALYSIS

As in Chapters 5 and 6, the stepwise regression method is used in this chapter to address the fifth research objective, namely to examine the relationship between IIR and the cost of debt. Owing to missing data (17 companies recorded no short- or long-term interest-bearing debt in their financial statements), the initial sample of 85 companies was reduced to 68.

Besides the IIR score, additional explanatory variables as used in the literature to explain variations in the cost of debt were discussed in Section 7.3. These were also the variables that were used in the stepwise regression model-building process. Table 7.2 summarises the calculation of these variables, as well as the expected association of each variable with the dependent variable, cost of debt.

Further to the endogeneity discussion in Section 2.8, Nikolaev and Van Lent (2005) specifically cautioned the endogeneity problem in disclosure–cost of debt studies. The Wu-Hausman test was used to test for this potential endogenous problem. The results thereof are discussed in Section 7.5.

Table: 7.2: Independent variables used in the stepwise regression models of the cost of debt: description and expected relationship

Acronym	Variable	H	Description	Expected relationship
Independent continuous variables				
IIR	IIR score	1	Internet investor relations (IIR) score per company	-
SIZE	Share price	2	Natural logarithm of the average daily (over 250 trading days) closing share price	-
LEV	Leverage	3	Ratio between debt and assets	+
MTB	Market-to-book value ratio	4	Natural logarithm of the ratio between the share price (market value) and the book value of equity	-
EPS VAR	Earnings per share variability	5	Natural logarithm of the standard deviation of the last four annual growth percentages in headline earnings per share	+
ROE	Return on equity	6	Ratio between profit to ordinary shareholders interest	-
IC	Interest cover	7	Ratio between earnings before interest and taxes and interest expense	-
Independent categorical variable				
LIST.D	Dual listing	8	Dummy variable representing one if the company is dually listed on the JSE and any other stock exchange	-

7.5 RESULTS

7.5.1 Selected descriptive statistics

The descriptive statistics are set out in Table 7.3. As discussed in Section 7.3, the natural logarithm of some of these variables were used to reduce the skewness (based on an examination of the normality plots). For the convenience of the reader, statistics for these variables (share price, market-to-book value ratio and the earnings per share variability) are presented prior to their natural logarithmic transformations, which were used in the multivariate regression analysis. Table 7.3 depicts the descriptive statistics for only the reduced sample of 68 companies, as discussed in Section 7.4.

The results in Table 7.3 underline the significant variation between the companies included in the sample. This variation supports the objective of the sample selection criteria followed in Chapter 4 to select a sample that would ensure significant cross-sectional variation.

Table 7.3: Descriptive statistics: variables used to examine cost of debt variations

Panel A: Dependent variables							
	Average	**Minimum**	**Quartile**			**Maximum**	**Standard deviation**
			Q1	**Q2**	**Q3**		
Cost of debt (before tax)	11.27%	0.41%	6.90%	9.30%	12.42%	58.54%	9.09
Panel B: Independent variables							
	Average	**Minimum**	**Quartile**			**Maximum**	**Standard deviation**
			Q1	**Q2**	**Q3**		
Internet investor relations (IIR)	104.85	13.50	70.00	103.00	133.88	193.50	42.00
Share price (SIZE) (ZAR)	R71.85	R0.03	R4.53	R25.66	R113.52	R696.21	R107.95
Leverage (LEV)	0.49	0.002	0.33	0.44	0.64	1.21	0.23
Market-to-book ratio (MTB)	2.22	0.13	0.81	1.46	2.13	12.99	2.50
EPS variability (EPS VAR)	164.11	2.13	15.96	37.65	118.99	3 207.27	422.31
Return on equity (ROE)	9.05%	-40.09%	2.43%	12.30%	17.87%	58.80%	19.38%
Interest cover (IC)	66.32	-92.69	0.67	4.28	8.65	3 076	378.04

7.5.2 Correlation analysis

Table 7.4 shows the Pearson correlation coefficients between the dependent variable (cost of debt) and the independent variables as listed in Table 7.2. For the convenience of the reader, correlation coefficients significant at the 1% or better level are printed in **green**, those at 5% or better level in **blue**, and finally those 10% or better level in **red**. For log transformed variables, the correlation coefficient depicts the correlation with the natural logarithm of the variables, as applicable.

Table 7.4: Correlation matrix: cost of debt and independent variables

	CoD	**IIR**	**LEV**	**MTB**	**EPS VAR**	**IC**	**ROE**	**LIST.D**	**SP**
CoD	1.00								
IIR	**-0.29**	1.00							
LEV	**-0.21**	**0.29**	1.00						
MTB	-0.13	0.10	**0.33**	1.00					
EPS VAR	**0.32**	-0.19	**-0.38**	**-0.54**	1.00				
IC	0.04	0.08	-0.12	**0.29**	**-0.25**	1.00			
ROE	-0.09	**0.23**	0.17	**0.64**	**-0.55**	**0.30**	1.00		
LIST.D	-0.03	**0.30**	-0.06	-0.15	**0.33**	-0.08	-0.10	1.00	
SP	**-0.26**	**0.54**	**0.29**	**0.54**	**-0.47**	0.16	**0.61**	0.13	1.00

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level; CoD = cost of debt; IIR = Internet investor relations; LEV = leverage; MTB = market-to-book value ratio; EPS VAR = earnings per share variability; IC = interest cover; ROE = return on equity; LIST.D = dual listing; SP = share price

Table 7.4 shows significant negative correlations between the cost of debt (CoD) and both IIR and share price (SP), as well as a significant positive correlation with the earnings per share variability (EPS VAR). The directions of these coefficients are as expected. The significant negative correlation coefficient between the cost of debt and leverage (LEV) is contrary to what was expected.

The significant positive correlations between leverage and both the share price (SP) and IIR, and the negative correlations between the cost of debt and both the share price (SP) and IIR may, however, explain the negative correlation between leverage and the cost of debt. Larger companies (i.e. share price) therefore not only borrow greater amounts, but also have higher IIR scores that are negatively correlated with the cost of debt. The correlation coefficients between the cost of debt and each of the following: the market-to-book value ratio, interest cover, return on equity and being a dual listed company are not statistically significant.

7.5.3 Regression estimation results

As discussed in Section 7.4, the Wu-Hausman test was used to test for a potential endogenous problem. The Wu-Hausman test confirmed both the strength of the instrumental variable used (i.e. being audited by a big four audit company) and the absence of endogeneity. The Ho hypothesis, namely that IIR is an exogenous variable, was accepted as the p-value of 0.86 has indicated that the Ho hypothesis cannot be rejected. The Ho hypothesis of a weak instrumental variable was however rejected with a highly significant p-value of 0.00.

Based on an examination of the normality plots of residuals, the dependent variable, namely cost of debt, was log transformed to improve normality. Residual plots of predicted versus residual scores were examined, and no evidence of heteroscedasticity was found. The minimum tolerance value of the reported regression model was 0.96 (i.e. a maximum variance inflation factor of 1.04) and indicated the absence of multicollinearity. The Durbin-Watson statistic of 2.03 confirmed the absence of autocorrelation.

Table 7.5 presents the multivariate regression results of the stepwise regression where the dependent variable is the cost of debt. As in Table 7.4, regression coefficients statistically significant at the 1% or better level are printed in **green**, those at the 5% or better level in **blue**, and those at the 10% or better level in **red**.

The direction of all coefficients reported in Table 7.5 are as expected. The statistically significant association between IIR and the cost of debt suggested that companies may benefit from an enhanced IIR strategy through a decreased cost of debt. IIR was therefore assessed as credible information by creditors, decreasing their perception of the default risk and therefore the cost of debt.

Table 7.5: Regression results: regression of the cost of debt on IIR and EPS variability

	Cost of debt (before tax)
$\beta 0$	**-1.01**
IIR	**-0.002**
Earnings per share variability	**0.05**
Adjusted R^2 (%)	14.22%
F-value	6.55
Durbin-Watson	2.03

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

Although marginally so, earnings per share variability was significantly positively related to the cost of debt. An increased variability in the earnings per share growth increases the difficulty for creditors to predict the future profitability of a company, resulting in an upward adjustment of the default risk and therefore the cost of debt.

As a robustness check, the cost of debt (as reported in Table 7.5 and calculated according to Formula 7.2) calculation was replaced with three alternative calculations: (1) opening balance of interest-bearing debt used as denominator; (2) after-tax cost of debt by merely multiplying the Formula 7.2 cost of debt with 72%; and (3) after-tax cost of debt by only multiplying with 72% if the company had reported a profit in their latest financial statements. For all three, both IIR and the earnings per share variability remained statistically significant, and the directions of all coefficients remained unchanged.

The 72% was calculated as 100% minus the current corporate tax rate in South Africa, namely 28%, and the return on equity ratio was used to assess whether the company reported a profit or not. The rationale in only multiplying with 72% if the company had reported a profit was that the tax advantage was only available for companies that had taxable profits (although the dissertation acknowledges that accounting profits are not necessarily the same as taxable profits, given differences between accounting and tax rules). Assuming that JSE-listed companies will in future all realise profits, a more straightforward approach is to multiply the cost of debt with 72% irrespective of the results reported in the latest financial statements.

Although the adjusted R^2 was very low – that is only 14.22% of the variation in the cost of debt was explained by the two independent variables – it compared favourably with previous disclosure–cost of debt studies. Guidara *et al.* (2014) examined the relationship between annual report voluntary disclosure and the cost of debt using South African data and reported an adjusted R^2 of 8.22%. Similar to this study, Orens *et al.* (2010) measured corporate website disclosure (although different attributes were measured). Orens *et al.* (2010) reported an adjusted R^2 of 13.11% in their disclosure–cost of debt regression using northern American data and 7.63% using continental European data. In a multicountry setting, Francis *et al.* (2005a) reported an adjusted R^2 of 8.00%. The only

disclosure–cost of debt study to date that has reported a significantly higher adjusted R^2 is the Sengupta (1998) study, with 55%.

7.6 SUMMARY AND CONCLUSION

The purpose of this chapter was to examine the relationship between IIR and the cost of debt. Stepwise regression model-building was used with cost of debt as the dependent variable, and the independent variables as identified from the literature and summarised in Table 7.2. Of the independent variables listed in Table 7.2, only IIR and earnings per share variability remained statistically significant predictors of the cost of debt. The results suggest that companies may benefit from a reduced cost of debt through an enhanced policy of IIR.

To the best knowledge of the dissertation, this is the first study that has examined the relationship between IIR and the cost of debt in South Africa. A recent study using South African data (Guidara *et al*., 2014) also examined the disclosure–cost of debt relationship and also reported a significant negative association between disclosure and the cost of debt. However, the Guidara study differed from this study in a number of respects. Firstly, the attributes measured were different. The Guidara study measured only content and, although some of the attributes which were measured overlap, significant differences exist in the attributes measured. The Guidara study, for example, did not measure any of the following attributes that were measured in this study: archived financial results, alternative financial statement presentation formats (e.g. Excel), and results or investor presentations. Secondly, the Guidara study measured the extent of voluntary disclosure in annual reports. Thirdly, the sample size differed. The Guidara study measured only 20 JSE-listed companies. An advantage of the Guidara study over this study, however, was the fact that the Guidara study examined the relationship over a three-year period as compared to this study that relied on one measurement in time of both IIR and the cost of debt.

CHAPTER 8
COST OF CAPITAL

Whether disclosure policies and financial reporting affect a firm's cost of equity is one of the most interesting, and important questions in the accounting and finance literature – Beyer, Cohen, Lys and Walther (2010)

8.1 INTRODUCTION

The cost of capital – also named the weighted average cost of capital (WACC) – is the weighted average cost of equity and cost of debt. In its most basic form, weights are assigned according to the respective proportions of equity and debt in the capital structure of the company. Cost of capital is used, *among others,* by companies, investors and regulatory authorities, and for a variety of reasons.

Companies use the cost of capital to evaluate capital projects (e.g. as hurdle rate in investment decisions) and for the determination of the fair value of assets for corporate reporting purposes (in the absence of a liquid market). Investors, on the other hand, use cost of capital to perform discounted cash flow valuations and to calculate performance indicators such as economic value added (EVA)[217] (Correia, Flynn, Uliana & Wormald, 2013: 7-2). According to Correia *et al.* (2013: 7-3), cost of capital is further used by regulatory authorities to determine prices for companies that are operating in industries such as water and power transmission.

Chapter 7 discussed the association between the cost of debt and Internet investor relations (IIR) and concluded that companies may benefit from increased IIR levels in the form of a decreased borrowing cost. Compared to the cost of debt, the cost of equity has by far received most of the attention in the literature. It is important to note from the outset that the cost of equity and the cost of debt are measured in two fundamentally different ways, and are not necessarily positively related (as showed by research), notwithstanding the fact that both are theoretically based on the risk-free rate.

For the purpose of this study, the cost of debt was measured as the interest expense divided by the average interest-bearing debt. Theoretically, the cost of debt can also be defined as the sum of the risk-free rate plus the default risk applicable to the company. The cost of equity, on the other hand, is the rate of return required by investors. This study used the capital asset pricing model (CAPM) to calculate the cost of equity. As discussed in Section 8.2, the CAPM is based on the risk-free rate, the market return and the beta of the share.

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[217] Economic value added (EVA) = operating income – (WACC x invested capital).

In conventional finance literature, it is often reasoned that there is an optimal capital structure[218], that is an optimal level of equity and debt, at which a company's cost of capital is minimised. The premise on which this notion is based is that the cost of debt is lower compared to the cost of equity, and mainly for two reasons. Firstly, creditors will generally face less risk compared to shareholders and, secondly, interest payments are tax deductible. Finance theory, however, cautions that as the proportion of debt financing increases, shareholders will demand a higher return as they realise that the risk of their investment is increasing. Ultimately, creditors will re-adjust their measurement of the default risk and therefore increase their required returns (Kasozi, 2009: 16), resulting in an increased cost of capital.

Although a positive association between the cost of debt and the cost of equity can therefore intuitively be expected, McKenzie and Partington (2013) emphasised that there is no default risk adjustment in the CAPM. They further distinguish between the cost of equity and the cost of debt in that the cost of equity is based on expected returns, which is the function of both the return required by investors and the expected cash flows. Cost of debt, on the other hand, is the guaranteed return and is a function of the default risk. McKenzie and Partington (2013) argued that an adjustment of the default risk will only influence the expected future cash flows and not the return required by investors.

Following the prescribed guidelines for expert witnesses in proceedings in the Federal Court of Australia, McKenzie and Partington (2003) prepared a report entitled "The relationship between the cost of debt and the cost of equity". In this report, McKenzie and Partington (2013: 20) stated:

> The survey of the literature presented in our response to Question 1.a., highlights that the cost of debt and the cost of equity can move independently. There is likely to be some commonality in the overall cost of debt and equity since the risk free rate is the benchmark for both. However, that relationship is weak, if it exists at all, and the relation is highly unstable. Our survey of the literature provides no clear guidance on the appropriate manner with which to model the relationship.

The purposes of this chapter are twofold: firstly, to examine the association between IIR and the cost of equity and, secondly, to examine the association between IIR and the cost of capital. The association between disclosure and the cost of equity can be examined either through a direct examination of the effect of disclosure on the cost of equity, or alternatively through an indirect examination of the effect of disclosure on information asymmetry.

Analytical and empirical research that has examined the direct association between disclosure and the cost of equity was discussed in Section 2.5. Although there is strong support for a negative

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[218] Although various theories have been developed to explain company capital structures, e.g. trade-off theory, pecking order theory and the Modigliani-Miller models, a survey of the finance literature shows that there is no universally accepted theory in this regard (Kasozi, 2009: 21).

association, studies that have found only partial evidence or no relation or even a positive relationship were discussed in Section 2.5.2.

The indirect relationship, as depicted in Figure 2.1, was discussed in Section 2.4. To review the discussion briefly, economic theory suggests two distinct routes in support of the hypothesis that disclosure could decrease the cost of equity, the liquidity route and the estimation risk route. The liquidity route argues that improved disclosure will increase liquidity, which will result in a decrease in the cost of equity, either through reduced transaction costs or an increased demand. The estimation risk route is associated with the investors' assessments of the parameters of the expected return. Both the reduced estimation risk route and the increased liquidity route are based on a reduction of information asymmetry. As with disclosure–cost of equity studies, empirical research to date that examined the relationship between disclosure and information asymmetry has produced mixed results.

To summarise the results found in Chapter 6: a significant negative association between IIR and information asymmetry was found for four of the five information asymmetry proxies that were used in this study (bid-ask spread, price impact, share turnover and analyst following). No association between IIR and share price volatility was found. Although the indirect route is often used as proxy for the association between disclosure and the cost of equity, the relationship between information asymmetry and the cost of equity is, however, rather complex and not clear, as the following studies suggest.

Using the number of shareholders as proxy for the level of competition, Armstrong *et al.* (2011) found that in a perfect market competition setting (i.e. consisting of a high number of shareholders), information asymmetry has no separate effect on the cost of equity, as opposed to an imperfect competition setting (i.e. where there is a low number of shareholders) where information asymmetry can have a separate effect on the cost of equity. Bhattacharya *et al.* (2007) found that the degree of information risk is more important than the distribution thereof (i.e. information asymmetry). Using a theoretically rational expectation model, Lambert *et al.* (2009) showed that, if information precision is considered, information asymmetry has no effect on the cost of equity.

The remainder of this chapter is organised into six distinct sections as follows. Firstly, Section 8.2 discusses cost of equity proxies that were used in literature and concludes with how the cost of equity is measured in this study. Section 8.3 then briefly discusses the measurement of cost of capital. Next, independent variables, besides IIR, that were used in the literature to explain variations in the cost of equity and capital are discussed in Section 8.4. Section 8.5 then elaborates on the specific research methodology, including a discussion of how this study addressed endogeneity. In the last two sections, the results are discussed, and finally a summary and conclusion close the chapter.

8.2 COST OF EQUITY

Methods used in the literature to measure the cost of equity were categorised into two distinct groups in Section 2.6: analyst forecast or *ex ante* estimates (Section 2.6.1) and share return-based or *ex post* estimates (Section 2.6.2). Even though *ex ante* estimate methods (e.g. the discounted free cash flow model) seem to be the most popular method to estimate the cost of equity, it was considered not achievable in this study for the following reason.

As discussed in Section 2.6.1, all analyst forecast-based or *ex ante* estimates require analyst forecast information (e.g. earnings per share projections). In the study sample, only 45 companies were followed by at least one analyst, and of these companies only 30 were followed by two or more analysts. This study assumes that at least two analyst forecasts are necessary to reliably use an analyst forecast-based estimate technique. A similar argument was used by Armstrong *et al.* (2011: 7). The use of *ex ante* methods were therefore considered not feasible in this study, as the variables required would have reduced the sample size to a number that would have severely restricted the power of statistical tests.

Four share return-based or *ex post* methods were discussed in Section 2.6.2: realised returns, the CAPM, the Fama-French three-factor model and the earnings-to-price ratio. The earnings-to-price ratio is the inverse of the well-known price-to-earnings (PE) ratio. Firer (1993) reasoned that high price-to-earnings ratios are a function of growth prospects, and that it is not rational to assume that the fact that companies have such prospects results in investors requiring lower returns and therefore a lower cost of equity. Realised returns are considered a noisy measure of the cost of equity (Fu *et al*., 2012; Gebhardt *et al*., 2001).

A further disadvantage of both the earnings-to-price ratio, as well as the realised returns method is the difficulty to use negative values. Of the 85 companies in the sample, 14 had a negative earnings-to-price ratio and 27 a negative realised return. Given the reduced sample sizes, both the earnings-to-price ratio and realised returns were only examined as cost of equity alternatives in this study and were not used in cost of capital calculations.

The earnings-to-price ratio was calculated as the inverse of the price-to-earnings (PE) ratio. The PE ratio was captured from the INET BFA database. Realised returns were captured from the INET BFA database from the total returns model. The total returns model calculates the return of a company using the share price and dividend yield.

Although cost of debt was only calculated using a reduced sample size of 68 companies (as discussed in Chapter 7), this did not reduce the cost of capital sample size, as the cost of capital for companies without interest-bearing debt is the cost of equity (as discussed in Section 8.3).

The capital asset-pricing model (CAPM) is based on the notion that the return required by investors is positively correlated with risk.

The CAPM estimates the cost of equity (k_e) using the following formula:

$$k_e = R_f + ß\,(R_m - R_f) \tag{8.1}$$

where:

R_f = the risk-free rate;

ß = the share beta; and

R_m = the expected market return.

The CAPM is often criticised, mainly because of the assumptions on which it is based. The CAPM assumptions are as follows (ACCA, 2015):

- Investors hold diversified portfolios.
- There is a single-period transaction horizon (i.e. a minimum holding period of one year).
- Investors can borrow and lend at the risk-free rate of return.
- Perfect capital market exists (i.e. there are no taxes or transaction costs, perfect information is freely available to all investors; all investors are rational and risk averse; there are a large number of buyers and sellers in the market).

The assumption that investors hold diversified portfolios implies that investors will only require a return for the systematic risk (also called market, undiversifiable or uncontrollable risk), as the unsystematic risk (also called diversifiable, asset-specific, controllable or idiosyncratic risk) has been removed by the holding of a diversified portfolio and can therefore be ignored.

Although systematic risk affects all companies, some companies are more sensitive to systematic risk than others. The beta of a share measures the market risk of that particular share as compared to the rest of the market. The beta coefficient of a share is calculated with the following formula (Bradfield, 2003):

$$\frac{Covariance\ (r_s,r_m)}{\sigma^2 m} \tag{8.2}$$

where:

r_s = share price;

r_m = market index; and

$\sigma^2{}_m$ = market variance.

The beta coefficient is therefore a measure of the volatility of a share compared to the rest of the market. Researchers usually use monthly intervals (over a five-year period) to calculate the returns needed for the estimation process (Bradfield, 2003: 50). If a share is, however, thinly traded then it is likely that the month-end price may not result from a trade on that day, but is merely the price of the last trade in that month. The result is a mismatch between the market index and the share price,

leading to a downward bias in the covariance estimate, resulting in a downward bias in the estimate of the beta (Bradfield, 2003: 50).

As discussed in Section 4.2, the study sample was randomly selected from a population that did not exclude companies based on liquidity. The study sample therefore included less liquid, thinly traded shares, which might have affected the credibility of the CAPM and the results of statistical tests that were based thereon. Harvey (1995) further report that betas of emerging markets fail to explain any cross-sectional variation in expected returns in a single-factor model framework such as the CAPM.

Besides the possible bias in beta estimates for companies that suffer from thin-trading effects as discussed above, the CAPM is further criticised in disclosure–equity literature for providing no role for risk factors other than market beta (e.g. amount (estimation risk) and distribution (information asymmetry) of information risk) (Hail, 2002: 760). As discussed above, the CAPM is based on the assumption that investors hold diversified portfolios that imply that they will only be rewarded for systematic or undiversifiable risk. In the specific context of this study, the cost of equity was therefore only linked to IIR when information risk (i.e. information asymmetry) was directly linked to the market beta itself.

Hughes, Liu and Liu (2007) and Lambert *et al.* (2007) argued that disclosure has no impact on the cost of equity, if it conveys only information on diversifiable risks. Voluntary disclosure, and therefore IIR, can only lead to a lower cost of equity if information risk is undiversifiable (Eugster, 2014).

Despite all the critique against the CAPM, it was decided to use the CAPM as cost of equity estimate in this study for the following reasons:

i) As discussed in Section 2.6.2.2, the CAPM is the most preferred method in the valuation practice (PwC, 2015).
ii) No consensus exists, but various studies found a positive association between beta and the *ex-ante* cost of equity (Botosan, 1997; Botosan & Plumlee, 2002; Hail, 2002).
iii) As also previously argued by Hail (2002: 756), the purpose of this study was not to explain the absolute level of the cost of equity, but rather to examine the cross-sectional variation in the cost of equity, conditional on the varying observed levels of IIR.
iv) Notwithstanding the critique against the CAPM, some empirical support for the CAPM is given by Da, Gua and Jagannathan (2012) and the CAPM is often used to measure the cost of equity in emerging country studies (Collins & Abrahamson, 2006; Hearn & Piesse, 2015), as well as developed country studies where analyst forecast information was not available (Fu *et al.,* 2012).
v) Thin-trading adjusted betas were used. According to Gopi (2016), the adjustment is done using the well-known trade-to-trade adjustment procedure, as also described by Bradfield (2003).

To summarise this section: Although *ex ante* and *ex post* cost of equity estimate methods are available, this study has, owing to the non-availability of data, used the well-known, but also

sometimes criticised, CAPM for its cost of equity estimates. The application of the CAPM in this study is discussed further in Section 8.5.

8.3 COST OF CAPITAL

Most studies to date have examined either the relationship between disclosure and the cost of debt or the cost of equity, with the latter receiving most attention in the literature. Disclosure studies that have examined both are sparse. Francis *et al.* (2005a) and Orens *et al.* (2010) have both separately examined the relationship between disclosure and the cost of equity, and disclosure and the cost of debt, but neither has examined the relationship between disclosure and the cost of capital. Omran and Pointon (2004) calculate the cost of capital by merely using the market interest rate as proxy for the cost of debt.

The cost of capital or WACC is the weighted average of the cost of equity and the cost of debt, and is calculated using the following formula (Correia *et al.*, 2013: 7-4):

$$WACC = R_e\left(\frac{E}{V}\right) + R_d * (1 - T_c) * \left(\frac{D}{V}\right) \quad (8.3)$$

where:

R_e = the cost of equity;

R_d = the cost of debt;

E = equity;

D = debt;

V = sum of equity and debt; and

T_c = the corporate tax rate.

Although either market values or book values can be used to calculate the cost of capital, the use of market values is considered more relevant (Correia *et al.*, 2013: 7-3). The calculation of the cost of capital (WACC) for the purpose of this study is further discussed in Section 8.5.

8.4 PRIOR THEORETICAL DIRECTIONS OF RELATIONSHIPS AND MEASUREMENT

As discussed, a negative association between IIR and, in turn, the cost of equity and the cost of capital is expected. In addition to the IIR score, additional explanatory variables, as used in the literature to explain variations in the cost of equity and cost of capital levels, are discussed in this section. Table 8.1 shows the different proxies that were used in the literature for each of the independent variables discussed in this section. More specifically, this section discusses: (1) the underlying reasons used by the literature to hypothesise the direction of relationships, (2) the results found in the literature in terms of statistical significance and the economic sense of directions, (3)

the direction hypothesised in this dissertation and finally, (4) a brief discussion of how each of these variables were measured in this dissertation.

Table 8.1: Proxies used in the literature to measure the determinants of the cost of equity

Variable	Proxy used
SIZE	Logarithm of total assets: Orens *et al*. (2010) Market capitalisation: Froidevaux (2004); Fu *et al*. (2012); Hail (2002)
LEVERAGE	Debt/Assets: Orens *et al*. (2010); Fu *et al*. (2012) Debt/Equity: Hail (2002)
PROFITABILITY	Dummy variable indicating the value of one if the company reports negative earnings: Orens *et al*. (2010)
EPS VARIABILITY	Logarithm of the percentage change in earnings per share between two years: Orens *et al*. (2010)
EQUITY GROWTH	Logarithm of one plus the percentage change in the book value of equity: Francis *et al*. (2005b) and Fu *et al*. (2012)
INDUSTRY	Industry specific cost of equity: Orens *et al*. (2010) and Froidevaux (2004)
DUAL LISTING	Sum of the number of stock exchange listings (one and a half (1.5) assigned for each US or LSE listing and one for all other listings): Orens *et al*. (2010)

Company size is theoretically inversely related to the cost of equity and the cost of capital (Orens *et al*., 2010: 1070; Botosan, 1997; Sengupta, 1998; Leuz & Verrecchia, 2000; Hail, 2002; Botosan & Plumlee, 2005). Empirical results are, however, mixed and do not report any consensus. Although Botosan (1997) and Fu *et al.* (2012) both found a significant negative association between size, as independent variable, and the cost of equity, Orens *et al.* (2010) found a similar association only when using northern American data. Similar to Froidevaux (2004), Hail (2002) and Liu and De Villiers (2011) who all found no significant association between size and the cost of equity, Orens *et al.* (2010) found no association using continental European data.

As discussed in Chapters 6 and 7, share price was used instead of market capitalisation or total assets to avoid potential multicollinearity. A further reason to use share price in this chapter was to facilitate the comparison of results to Chapters 6 and 7, where share price was used as independent variable to proxy for size.

Financial theory dictates a positive correlation between risk and return. One or a combination of the following are often used as risk variable in cost of equity studies: beta, leverage, earnings per share variability and analyst forecast dispersion. This study has used leverage and earnings per share variability as risk variables.

8.4.1 Share price (SP) (H2)

The calculation of share price has already been discussed in Section 6.3.1 and 7.3.1, and is therefore only summarised here in Table 8.4 in Section 8.5. A negative association between share price and both the cost of equity and cost of capital was expected (H2).

8.4.2 Leverage (LEV) (H3)

This study used the debt to asset ratio as proxy for leverage. Leverage has already been discussed in Sections 5.3.2, 6.3.2 and 7.3.2 and the calculation thereof is therefore only summarised here in Table 8.4 in Section 8.5. Hail (2002), Liu and De Villiers (2011) and Fu *et al.* (2012) all found a significant positive association between leverage, as independent variable, and the cost of equity, as dependent variable. Orens *et al.* (2010), however, found a significant positive association only when using northern American data and failed to find a similar association using continental European data.

As risk variable, a positive association between leverage and both the cost of equity and cost of capital was expected (H3).

8.4.3 Earnings per share (EPS) variability (EPS VAR) (H4)

Although Orens *et al*. (2010: 1070) argued that, given the increased risk in predicting the future earnings for companies with a high earnings variability, investors would require a larger risk premium and therefore cost of equity for such companies, they failed to find any significant association using both northern American and continental European data.

EPS variability has already been discussed in Section 7.3.4 and the calculation thereof is therefore only summarised here in Table 8.4 in Section 8.5. As risk variable, a positive association between EPS variability and both the cost of equity and cost of capital was expected (H4).

8.4.4 Market-to-book ratio (MTB) (H5)

Market to book (MTB) is a financial ratio that compares the market's valuation of a company to the book value of the company as reflected in its financial statements. The MTB ratio is said to reflect future growth opportunities and shares with a high MTB ratio, often labelled as growth shares, as opposed to shares with a low MTB ratio, categorised as value shares. Liu and De Villiers (2011) and Orens *et al*. (2010) found a significant negative association between the MTB ratio as independent variable and the cost of equity as dependent variable.

The MTB ratio has already been discussed in Sections 5.3.5 and 7.3.3 and the calculation thereof is therefore only summarised here in Table 8.4 in Section 8.5. A negative association between the MTB ratio and both the cost of equity and cost of capital was expected (H5).

8.4.5 Profitability (ROE) (H6)

As discussed in Section 7.3.5, uncertainty regarding future profitability equates to higher risk and therefore higher expected returns by creditors and investors. This study has used the return on equity (ROE) ratio as profitability proxy. Profitability has already been discussed in Sections 5.3.4 and 7.3.5 and the calculation thereof is therefore only summarised here in Table 8.4 in Section 8.5.

Orens *et al.* (2010) assigned a dummy variable of one for companies that realised a loss in their latest financial statements as inverse for profitability and found a significant positive association between the dummy variable, as independent variable, and the cost of equity.

A negative association between ROE and both the cost of equity and cost of capital was expected (H6).

8.4.6 Equity growth (EQUIT) (H7)

Following Francis *et al.* (2005b: 307) and Fu *et al.* (2012), this study has calculated equity growth as the natural logarithm of one plus the percentage change in the book value of equity. Similar to profitability, higher equity growth means lower uncertainty and risk, and is therefore negatively related to the cost of equity.

Both Fu *et al.* (2012: 14) and Francis *et al.* (2005b: 312) found a negative relationship between equity growth, as independent variable, and the earnings-to-price ratio, as dependent variable. To calculate equity growth, the book value of equity was captured from INET BFA. A negative association between equity growth and both the cost of equity and cost of capital was expected (H7).

8.4.7 Industry membership (IND) (H8)

Gebhardt *et al.* (2001) showed that the cost of equity is industry dependent. To control for industry, Orens *et al.* (2010: 1072) and Froidevaux (2004: 71) calculated the industry-specific cost of equity. This study used the industry beta as proxy for industry membership. A positive association between industry membership and both the cost of equity and cost of capital was expected (H8).

8.4.8 Dual listing (LIST.D) (H9)

Maphumulo (2012: 14-18) discussed potential advantages and disadvantages of dual listings. Perceived advantages of a dual listing include: increased liquidity, decreased cost of equity and increased visibility. Dual listings have already been discussed in Sections 5.3.9, 6.3.6 and 7.3.7 and the calculation thereof is therefore only summarised here in Table 8.4 in Section 8.5. A negative association between having a dual listing and the cost of equity was expected (H9).

8.5 METHOD OF STATISTICAL ANALYSIS

As in Chapters 5 to 7, the stepwise regression method was used in this chapter to address the sixth and seventh research objectives, i.e. to respectively examine the relationship between IIR and the cost of equity and the cost of capital. This section first elaborated on the methodologies followed in the calculation of each of the dependent variables (cost of equity and cost of capital), before dealing with the independent variables that were used in the regressions.

8.5.1 Cost of equity

As discussed in Section 8.2, this study used the CAPM and therefore the following formula to calculate the cost of equity:

$$k_e = R_f + ß\,(R_m - R_f) \tag{8.4}$$

where:

R_f = the risk-free rate;

ß = the share beta; and

$R_m - R_f$ = the market risk premium.

Formula 8.4 therefore requires three components for each company. To summarise what follows, the R186 was used as risk-free rate (8.05%), 6.1% as the market risk premium, and share betas, using the ALSI as market proxy.

Although some academics promote the use of the market yield on short-term government securities such as Treasury Bills, in practice, users of the CAPM tend to use the long-term bond yield on government securities as proxy for the risk-free rate (Correia *et al.*, 2013: 7-22). In South Africa, various government bonds are available (e.g. RSA R157, RSA R203 and RSA 186). In a recent PwC survey (PwC, 2015), the R186 was the most preferred government bond among survey participants in South Africa. This study used the R186 as proxy for the risk-free rate. The daily R186 closing rates were captured from INET BFA for all trading days from 1 December 2014 to 30 November 2015. The average, 8.05%, was calculated and used as the risk-free rate.

Regarding the market risk premium, PwC survey participants were further asked to indicate the range of risk premiums they use when applying the CAPM. Market risk premiums among survey participants varied from 5.4% (low) to 6.8% (high). This study used the average of the low and the high, resulting in 6.1%. According to Correia *et al.* (2013: 7-23), analysts in South Africa have tended to use a risk premium between 5% and 7% in the past.

Share betas were obtained from BNP Paribus Securities South Africa. BNP Paribus calculates share betas using monthly returns over a 60-month period. The All Share Index (ALSI) was chosen as market proxy. According to Bradfield (2003: 46), the ALSI is preferred as market proxy over secondary component indices such as the Financial and Industrial Index, Resource Index and the Top-40 index, based on the argument that an index that is as comprehensive as possible in covering the market should be used.

Gopi (2016) is of the opinion that the share betas supplied by BNP Paribus are unique as a result of the implementation of two adjustments, firstly a 'Bayesian' adjustment for regression bias and secondly an adjustment for thin-trading, known as the 'trade-to-trade' procedure.

Bradfield (2003: 50) describes the regression bias as follows: “An estimated beta coefficient which is far higher than the average beta is more likely to be an overestimate of the true beta than an underestimate. Similarly, a very low estimated beta is more likely to be an underestimate”. Gopi (2016) claims that this ‘Bayesian’ adjustment improves the predictability of betas by some 20%.

As discussed in Section 4.2, the study sample was randomly selected from a population that did not exclude companies based on liquidity. The study sample therefore included less liquid, thinly traded shares. As discussed in Section 8.2, if a share is thinly traded it is likely that the month-end price may not result from a trade on that day, but is merely the price of the last trade in that month. The result is a mismatch between the market index and the share price, resulting in a downward bias in the estimate of the beta. The purpose of the ‘trade-to-trade’ procedure is to match the market returns to the same consecutive trade days as the share in order to rectify this mismatch.

On the other hand, INET BFA does not make any adjustments. Their calculation is done purely using ordinary least square regression. In doing this calculation, five years of historical monthly data is used with the ALSI as the market proxy and the R186 as the risk free rate.

BNP Paribus, however, does not report on beta for companies listed on the Venture Capital and the Development Capital Boards of the JSE. Two companies in the study sample, Ecsponent Ltd. (ECS) and Indequity Group Ltd. (IDQ), are listed on the Venture Capital and the Development Capital Board of the JSE, respectively. Share betas for these companies were captured from INET BFA.

Notwithstanding the fact that BNP Paribus calculates share betas using the well-known ‘trade-to-trade’ procedure, as discussed above, to adjust for thin trading, negative betas were found for 14 of the companies in the study sample. A negative beta means that the share is moving in the opposite direction to the ALSI. Although negative betas are theoretically possible, they are not intuitively expected for two reasons. Firstly, a negative beta implies a required return less than the risk-free rate and, secondly, markets tend to rise over the long term, which raises a question about the long-term survival of companies with a negative beta.

One may, however, argue that an investment portfolio may benefit from including companies with negative betas, given hedging advantages. Gold companies, for example, are sometimes associated with moving in the opposite direction and, as such, are considered as a safe investment in a bear market. One may therefore argue that investors will accept returns lower than the risk-free rate for such shares.

The number of days on which no trading occurred can be used as an indication of the extent to which the share is thinly traded (Bradfield, 2003: 52). The number of trades per day was captured from INET BFA and, from this, the number of non-trading days per company was calculated for the 250 trading days from 1 December 2014 to 30 November 2015. Table 8.2 shows that only 49 of the 85 companies (57.65%) in the sample had traded every day, and that almost one quarter of the companies (21 companies or 24.71%) had 50 or more non-trading days.

On closer inspection of the 14 companies with negative betas in Table 8.2, the following was evident:

i) All companies with negative betas had not traded for at least one day, except Torre Industries Limited. Torre was, however, only listed on the JSE on 26 November 2012 and the calculation of its beta was therefore only based on 37 monthly returns, as opposed to the required 60 monthly returns.

ii) The seven companies with negative betas and fewer non-trading days than 100 were all constituents of the JSE Fledging Index, except for one company that was part of the Small Caps Index and one that was listed on the Venture Capital Market. Only two of these companies were in the mining sector (but not gold mining).

iii) The other six companies with negative betas and more non-trading days than 150 were all either constituents of the JSE Fledging Index or listed on the Development Capital Market or AltX. Only one company in this category was in the mining sector (but not gold mining).

Table 8.2: Non-trading days, betas and market capitalisation

Non-trading days	Number of companies	Number of negative betas	Average beta	Average market cap (millions)
150–210	10	6	0.16	R193.11
100–149	4	0	0.37	R745.75
50–99	7	2	0.32	R1 807.58
1–49	15	5	0.29	R1 687.70
0	49	1	0.57	R84 834.62

According to Bradfield (2003: 50), beta coefficients higher or lower than the average beta are, respectively, more likely to be an overestimate or underestimate of the true beta than an underestimate or overestimate. Table 8.2 shows an inverse relationship between non-trading days and the average beta. This inverse relationship with the average beta supports the notion of a downward bias for thinly traded shares (Bradfield, 2003: 50).

As discussed in Section 8.4, theory predicts a negative association between size and the cost of equity. Share beta as risk measure is positively correlated with the cost of equity. The positive relationship between the average beta and the average market capitalisation, as shown in Table 8.2, therefore further raises a question about the reliability of these share betas.

Two adjustments were therefore done in this study. Firstly, all negative betas were replaced with the industry beta as obtained from BNP Paribus Securities. Secondly, an adjustment was made to the cost of equity of smaller companies by adding a small share premium (SSP) to the cost of equity. The remainder of this dissertation will distinguish between the cost of equity (before SSP) and the cost of equity (after SSP). The cost of equity (before SSP) is the cost of equity calculated using the CAPM, after replacing the 14 negative betas with their industry betas, but before any SSP adjustment. Cost of equity (after SSP) is the cost of equity (before SSP) after the SSP adjustment.

The rationale of small share premiums (SSP) will now be discussed. In practice, small companies experience a higher rate of corporate failure (Correia *et al.*, 2013) and are expected to have higher returns (Fama & French, 1992). Although one will therefore expect that smaller companies will have higher betas to reflect this additional risk, it is often argued that the higher betas do not fully explain the higher returns historically achieved by smaller companies (Correia *et al.,* 2013; PwC, 2015).

Besides low liquidity, one further possible reason for this may be that there are other risks besides systematic risk that are associated with smaller companies, but are left unexplained by the CAPM. According to PwC (2015), the majority of survey participants do adjust for small company risk (86% of survey participants), and more specifically the majority do the adjustment by adding a risk premium to the overall cost of equity (instead of adjusting the beta or using a multiplying factor). The average premiums added to the cost of equity, as based on market capitalisation, are depicted in Table 8.3. Table 8.3 further shows the number of companies in this study sample in each suggested adjustment category. The risk premiums in Table 8.3 are based on the results of the PwC 2015 survey (PwC, 2015: 54).

Table 8.3: Risk premiums added to the cost of equity to adjust for the small company effect, with study sample companies categorised accordingly

Market capitalisation (millions)	**0 – 250**	**251- 500**	**501 – 1 000**	**1 001 – 1 500**	**1 501 – 2 000**	**2 000+**
Risk premium	6.5%	5.2%	3.8%	2.3%	1.5%	0.7%
Number companies	16	4	8	3	1	53

To calculate the cost of equity (after SSP), the cost of equity (before SSP) of companies was therefore increased, as depicted in Table 8.3, except for the +0.7% category to avoid subjectivity in deciding which companies in this category necessitated such an adjustment. Also, as robustness test, the cost of equity (after SSP) was calculated by adding the 0.7% to all companies with a market capitalisation exceeding R2 000 million. As discussed in Section 8.6.3.2, the results remained unchanged.

8.5.2 Cost of capital

Cost of capital (WACC) is calculated according to Formula 8.3,[219] as discussed above. Following the study of Omran and Pointon (2004: 254), this study used both book values and market values as weights. As discussed in Section 7.2, companies in South Africa rely mainly on financial institutions, such as banks, as source of external finance, as opposed to US companies, for example that rely more heavily on bonds.

[219] $\text{WACC} = R_e\left(\frac{E}{V}\right) + R_d * (1 - T_C) * \left(\frac{D}{V}\right)$

Whereas the market value of bonds vary as interest rates change, resulting in a difference between book values and market values, interest-bearing debt as used by South African companies have a much smaller margin between their book values and market values. This study therefore used the short-term and long-term interest-bearing debt (which was also used to calculate the cost of debt in Chapter 7), as published in the Statement of Financial Position for both the market value and the book value of debt.

The book value of equity is the total equity as captured from INET BFA. Preference shares contribute less than 1% of the total equity of the companies in the sample studied and were therefore removed from equity for the sake of consistency in the methodology applied. The market value of equity (market capitalisation) was also captured from INET BFA.

As per Formula 8.3, the after-tax cost of debt is used to calculate the cost of capital. As discussed in Chapter 7, the after-tax cost of debt can be calculated by merely multiplying the before-tax cost of debt with 72%, or by multiplying with 72% only if the company has reported a profit in its latest financial statements. Based on the fact that assessed losses can be carried forward and the going concern principle,[220] this study assumed that all companies would benefit from the tax advantage and therefore used the first approach by merely multiplying the before-cost of debt with 72% irrespective of whether the companies reported a profit or loss.

For companies with no interest-bearing debt, the equity component in the cost of capital calculation was therefore 100%, resulting in their cost of capital being equal to the cost of equity.

8.5.3 Independent variables and endogeneity

Besides the IIR score, additional explanatory variables, as used in the literature to explain variations in the cost of equity, were discussed in Section 8.4. These were also the variables that were used in the stepwise regression model-building process. Table 8.4 summarises the calculation of these variables, as well as the expected association of each variable with the two dependent variables examined here, i.e. cost of equity and cost of capital.

Similar to Chapters 6 and 7, the Wu-Hausman test was used to test for endogeneity. The results thereof are discussed in Section 8.6.

[220] The going concern principle is a well-known accounting principle and is the assumption that an entity will remain in business for the foreseeable future.

Table 8.4: Independent variables used to explain variations in cost of equity and cost of capital: description and expected relationship

Acronym	Variable	H	Description	Sign
Independent continuous variables				
IIR	Internet investor relations	1	Internet investor relations (IIR) score per company	-
SIZE	Share price	2	Natural logarithm of the average daily (over 250 trading days) closing share price	-
LEV	Leverage	3	Ratio between debt and assets	+
EPS VAR	Earnings per share variability	4	Natural logarithm of the standard deviation of the last four annual growth percentages in headline earnings per share	+
MTB	Market-to-book ratio	5	Natural logarithm of the ratio between the share price (market value) and the book value of equity	-
ROE	Return on equity	6	Ratio between profit to ordinary shareholders interest	-
EQUIT	Equity growth	7	Natural logarithm of one plus the percentage change in the book value of equity	-
IND	Industry	8	Industry beta	+
Independent categorical variables				
LIST.D	Dual listing	9	Dummy variable representing one if the company is dually listed on the JSE and any other stock exchange.	-

8.5.4 Non-linear relationships

Lam and Du (2004: 312) argued that increased disclosure in high information environments is less likely to have a negative association with information asymmetry, given the already rich disclosure environment. Hail (2002) reasoned that the lower overall disclosure level in Switzerland compared to the US may explain the stronger negative relationship between disclosure and the cost of equity they found using data from Switzerland as compared to studies using US data.

Various proxies for the information environment of a company can be found in the literature, such as: analyst following (Botosan, 1997), the disclosure or investor relations score (Chang *et al.*, 2008), company size (Froidevaux, 2004; Orens *et al.*, 2010; Agarwal *et al.*, 2016) and country-level factors (e.g. quality of mandatory reporting and investor protection) (Aerts *et al.*, 2007). Within single country studies, high analyst following, high disclosure scores and large companies (as a result of the increased visibility) are associated with a high disclosure environment.

Using analyst following as proxy for the information environment, Botosan (1997) found a negative association between disclosure and the cost of equity in a low information environment (low analyst following), but failed to find any association in a high information environment (high analyst following).

Chang *et al.* (2008) separately analysed high and low investor relations companies. Although these authors found a non-significant association between disclosure and information asymmetry for both samples, they did find a negative association for low investor relations companies (i.e. low information environment), as opposed to a positive association for high investor relations companies (i.e. high information environment) (both non-significant).

Orens *et al.* (2010: 1085) reasoned that smaller companies with enhanced disclosure are more likely to incur a lower cost of equity than larger companies. Agarwal *et al.* (2016: 31) found that investor relations quality is positively associated with analyst following, liquidity and valuation multiples, but only for smaller companies. Froidevaux (2004), on the other hand, found a statistically significant negative relationship (10% level) between the cost of equity and disclosure for a large company sub-sample and a negative, but statistically non-significant relationship for a small company sub-sample.

To explore evidence of such a non-linear relationship and, given the small share premium (SSP) adjustments, as discussed above, this chapter separately examines the relationship between IIR and both the cost of equity and the cost of capital for a small and large company sub-sample. The median market capitalisation was used to divide the sample into these two sub-samples.

8.6 RESULTS

8.6.1 Selected descriptive statistics

The descriptive statistics are set out in Table 8.5. As discussed in Section 8.4, the natural logarithm of some of the independent variables was used to reduce the skewness. For the convenience of the reader, the descriptive statistics for these variables (share price, earnings per share variability, market-to-book ratio and equity growth) are presented prior to their natural logarithmic transformations, where applicable.

The results in Table 8.5 underline the significant variation between the companies included in the sample and support the objective of the sample selection criteria followed in Chapter 4, namely to select a sample that would ensure significant cross-sectional variation.

Table 8.5: Descriptive statistics: variables used to examine cost of equity and cost of capital variations

Panel A: Dependent variables							
	Average	**Minimum**	**Quartile**			**Maximum**	**Standard deviation**
			Q1	**Q2**	**Q3**		
Cost of equity (before SSP)	11.92%	8.41%	10.31%	11.76%	13.02%	19.03%	2.19%
Cost of equity (after SSP)	13.68%	8.41%	10.74%	12.84%	15.79%	26.67%	3.92%
Earnings-to-price ratio (N=71)	7.72%	0.30%	4.62%	6.68%	9.23%	24.24%	4.91%
Realised returns (N=58)	19.56%	0.54%	8.56%	13.96%	28.46%	70.13%	14.83%
WACC (book value) (before SSP)	10.56%	3.97%	8.86%	10.48%	12.44%	17.51%	2.82%
WACC (market value) (before SSP)	10.69%	4.18%	8.99%	10.63%	12.44%	18.40%	2.58%
WACC (book value) (after SSP)	12.00%	3.97%	8.97%	11.56%	14.52%	26.67%	4.29%
WACC (market value) (after SSP)	12.06%	4.18%	9.29%	11.62%	14.66%	26.67%	3.99%
Panel B: Continuous independent variables							
	Average	**Minimum**	**Quartile**			**Maximum**	**Standard deviation**
			Q1	**Q2**	**Q3**		
Internet investor relations (IIR)	97.98	13.50	67.00	96.00	130.50	193.50	43.18
Share price (SP)	R65.22	R0.03	R4.11	R18.23	R111.09	R696.21	R101.93
Leverage (LEV)	0.45	0	0.28	0.40	0.61	1.21	0.25
EPS variability (EPS VAR)	160.10	2.13	16.27	38.79	120.38	3 207.27	392.52
Market to book (MTB)	2.28	0.13	0.89	1.43	2.88	12.99	2.53
Return on equity (ROE)	11.03	-40.09	2.78	12.77	20.62	84.02	21.14
Equity growth (EQUIT)	1.32	0.00	1.03	1.13	1.28	8.87	1.01
Panel C: Categorical independent variables							
	1	0	Total				
Dual listing (LIST.D)	25	60	85				

8.6.2 Correlation analysis

In Tables 8.6 to 8.9, regression coefficients that are statistically significant at the 1% or better level are printed in **green**, those at the 5% or better level in **blue**, and those at the 10% or better level in **red**. Table 8.6 shows the Pearson correlation coefficients between the cost of equity (before SSP),

cost of equity (after SSP), the earnings-to-price ratio and realised returns, and the independent variables, as listed in Table 8.4.

Table 8.6 shows the expected negative association between IIR and cost of equity (after SSP), but shows no significant association between IIR and the cost of equity (before SSP), the earnings-to-price ratio or realised returns for the full sample.

A valid measure of cost of equity will be positively correlated with risk measures and negatively correlated with market capitalisation, according to Hail (2002: 758), Froidevaux (2004: 62) and Orens *et al.* (2010: 1078). Only cost of equity (after SSP) and the earnings-to-price ratio are negative and statistically significantly related to share price.

Leverage and earnings per share (EPS) variability are both risk measures. Cost of equity (after SSP) and the earnings-to-price ratio was both significantly and positively related to earnings per share (EPS) variability, as was expected. Only the earnings-to-price ratio was significantly related to leverage, but negative, and not positive, as was expected.

Table 8.6: Correlation matrix: cost of equity, earnings-to-price ratio, realised returns and independent variables

	Cost of equity (before SSP)	Cost of equity (after SSP)	Earnings-to-price ratio	Realised returns
	N=85	N=85	N=71	N=58
Independent variables				
Internet investor relations (IIR)	0.05	**-0.34**	-0.09	-0.06
Share price (SP)	-0.17	**-0.65**	**-0.37**	0.22
Leverage (LEV)	0.05	-0.03	**-0.25**	-0.02
EPS variability (EPS VAR)	0.12	**0.38**	**0.25**	-0.13
Market-to-book ratio (MTB)	**-0.27**	**-0.46**	**-0.53**	**0.32**
Return on equity (ROE)	**-0.31**	**-0.44**	-0.09	0.13
Equity growth (EQUIT)	-0.14	**-0.21**	-0.19	0.17
Industry (IND)	**0.51**	**0.47**	**0.25**	-0.15
Dual listing (LIST.D)	**0.24**	0.14	**-0.25**	0.17

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

Table 8.6 further shows the expected negative associations between the market-to-book ratio, return on equity and equity growth and, respectively, the cost of equity (before SSP), the cost of equity (after SSP) and the earnings-to-price ratio. Dual listing, expected to be negatively related, was significantly and positively related to the cost of equity (before SSP) and negatively to the earnings-to-price ratio.

As discussed in Chapter 2, information asymmetry was expected to be positively correlated with the cost of equity. Table 8.7 shows the Pearson correlation coefficients between the cost of equity (before SSP), cost of equity (after SSP), the earnings-to-price ratio and realised returns, and the information asymmetry proxies used in Chapter 6.

Table 8.7: Correlation matrix: cost of equity, earnings-to-price ratio, realised returns and information asymmetry proxies

	Dependent variables			
	Cost of equity (before SSP)	**Cost of equity (after SSP)**	**Earnings-to-price**	**Realised returns**
	N=84	**N=84**	**N=71**	**N = 57**
Information asymmetry				
Bid-ask spread	**0.21**	**0.72**	**0.39**	-0.15
Price impact	**0.21**	**0.65**	**0.28**	0.003
Share price volatility	**0.41**	**0.75**	**0.55**	-0.07
Share turnover	0.01	**-0.32**	-0.11	-0.09
Analyst following	**0.18**	**-0.20**	-0.16	-0.09

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

As Table 8.6 shows, realised returns were positively related to share price and the market-to-book ratio. Realised returns were further negatively related to the industry beta, indicating that it might not be suitable as cost of equity proxy. Realised returns were also non-significantly related to all information asymmetry proxies that were used in this study (see Table 8.7).

Cost of equity (before SSP), cost of equity (after SSP) and the earnings-to-price ratio were all statistically significant, and, as expected, positively correlated with the first three information asymmetry proxies (bid-ask spread, price impact and share price volatility) in Table 8.7. Share turnover and analyst following were inversely related to information asymmetry. The associations between share turnover and analyst following with both the cost of equity (after SSP) and the earnings-to-price ratio were therefore negative, as theoretically expected.

If the results in Tables 8.6 and 8.7 were to be used to validate cost of equity proxies, these tables indicate that the cost of equity (after SSP) and the earnings-to-price ratio might be superior to realised returns and, to a lesser extent, to the cost of equity (before SSP).

Table 8.8 shows the Pearson correlation coefficients between the cost of capital (before SSP) and the cost of capital (after SSP), and the independent variables as listed in Table 8.4. As discussed in Section 8.2, only the cost of equity (before SSP) and the cost of equity (after SSP) were used in cost of capital calculations, therefore the distinction made between the cost of capital (before SSP) and the cost of capital (after SSP). Further, as discussed in Section 8.3, cost of capital was calculated using both market values and book values as capital structure weightings.

Table 8.8: Correlation matrix: cost of capital and independent variables

	Dependent variables			
	Cost of capital (before SSP)		Cost of capital (after SSP)	
	Market value	Book value	Market value	Book value
	N=85	N=85	N=85	N=85
Independent variables				
Internet investor relations (IIR)	**-0.33**	**-0.34**	**-0.52**	**-0.51**
Share price (SP)	**-0.33**	**-0.41**	**-0.63**	**-0.67**
Leverage (LEV)	**-0.20**	**-0.32**	**-0.20**	**-0.28**
EPS variability (EPS VAR)	**0.22**	**0.25**	**0.37**	**0.40**
Market-to-book ratio (MTB)	-0.07	**-0.25**	**-0.23**	**-0.37**
Return on equity (ROE)	**-0.20**	**-0.29**	**-0.28**	**-0.36**
Equity growth (EQUIT)	**-0.35**	-0.20	**-0.28**	**-0.22**
Industry (IND)	**0.37**	**0.38**	**0.33**	**0.35**
Dual listing (LIST.D)	-0.07	-0.09	-0.07	-0.08

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

All coefficients in Table 8.8 were significant, except for the MTB ratio (only cost of capital ((before SSP)) market value), equity growth (only cost of capital ((before SSP)) book value) and dual listing. Further, the directions of all coefficients, except leverage was as expected. This negative association may, however, have been the result of the reported negative association between IIR and the cost of debt (see Table 7.4). The negative association between IIR and the cost of debt was discussed in Section 7.5.2. Another possible reason for this negative association lies in the fact that the cost of debt is theoretically lower than the cost of equity (as also supported by the results of this study). As discussed in Section 8.1, the cost of capital would therefore decrease as the amount of debt in the capital structure increased, but only up to certain point, after which the cost of capital would increase as a result of the increased financial risk.

Table 8.9 displays the Pearson correlation coefficients between the independent variables that were used in the stepwise regression model to explain variations in cost of equity and cost of capital levels. Although Table 8.9 shows no evidence of any potential multicollinearity, tolerance values in all regression models were closely monitored and reported, where necessary.

Table 8.9: Correlation matrix: independent variables used to examine variations in the cost of equity and cost of capital

	IIR	SP	LEV	EPS VAR	MTB	ROE	EQUIT	IND	LIST.D
IIR	1.00								
Share price (SP)	**0.51**	1.00							
Leverage (LEV)	**0.37**	**0.29**	1.00						
EPS variability (EPS VAR)	**-0.20**	**-0.49**	**-0.32**	1.00					
Market-to-book ratio (MTB)	0.12	**0.50**	**0.27**	**-0.56**	1.00				
Return on equity (ROE)	0.10	**0.53**	0.06	**-0.40**	**0.54**	1.00			
Equity growth (EQUIT)	0.05	0.11	0.02	**-0.33**	0.10	**0.24**	1.00		
Industry (IND)	0.03	**-0.23**	**-0.22**	**0.40**	**-0.29**	**-0.21**	**-0.26**	1.00	
Dual listing (LIST.D)	**0.26**	0.04	-0.09	**0.31**	-0.13	-0.10	**-0.20**	**0.33**	1.00

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

8.6.3 Regression estimation results

In Tables 8.10 to 8.18, all regression coefficients that are statistically significant at the 1% or better level are printed in **green**, those at the 5% or better level in **blue**, and those at the 10% or better level in **red**.

As discussed in Section 8.5, the Wu-Hausman test was used in this chapter to test for a potential endogenous problem. As discussed in Chapter 2, an instrumental variable was needed to perform the Wu-Hausman test. For the purpose of this chapter, as well as Chapters 6 (information asymmetry) and 7 (cost of debt), being audited by a big four audit company was used as the instrumental variable.

In all regression models reported in this chapter, the Wu-Hausman test confirmed the fit of the instrumental variable, as well as the absence of endogeneity. The Wu-Hausman test results are shown in Table 8.10. For each of the test results shown in Table 8.10, the Ho hypothesis that IIR is an exogenous variable was tested. As the P-values in Table 8.10 indicate, none of these hypotheses were rejected and all five Ho hypotheses were therefore accepted, thus showing IIR was not an endogenous independent variable. The OLS regression model was therefore used in all further analyses in this chapter.

Table 8.10: Wu-Hausman results: IIR as independent variable, and the cost of equity and cost of capital as dependent variables

Dependent variable	F	P-value
Cost of equity (after SSP)	0.100	0.75
Cost of capital (market value) (before SSP)	0.087	0.77
Cost of capital (book value) (before SSP)	0.573	0.45
Cost of capital (market value) (after SSP)	0.567	0.45
Cost of capital (book value) (after SSP)	0.930	0.34

Tolerance values were assessed for all regression models reported in this section and the minimum tolerance value was 0.679 (i.e. a maximum variance inflation factor of 1.472), indicating the absence of multicollinearity. The results of the Durbin-Watson statistics were all between 1.746 and 2.120, confirming the absence of autocorrelation.

Histograms of the raw residuals, as well as normality plots of residuals, were examined and, for all regression results reported here, results suggested that residuals were approximately normally distributed with no influential outliers. Residual plots of predicted versus residuals were examined, and no evidence of heteroscedasticity was found in any of the reported regression models.

8.6.3.1 Cost of equity (before SSP)

Table 8.11 depicts a non-significant association between IIR and all of the following: cost of equity (before SSP), earnings-to-price ratio and realised returns for the full sample. As discussed in Section 8.5.4, evidence of a possible non-linear relationship between small and large companies was found in the literature. The sample of 85 companies was therefore further divided into two sub-samples, based on the median market capitalisation.

For the larger company sub-sample (market cap>median), a positive and significant relationship between IIR and the cost of equity (before SSP) was found. Although contrary to theoretical expectation, positive associations between disclosure and the cost of equity were found also by Botosan and Plumlee (2002), Kothari *et al*. (2009), Botosan *et al.* (2004), Cormier *et al.* (2009), Liu and De Villiers (2011) and Dhaliwal *et al.* (2011), as discussed in Section 2.5.2.

Table 8.11: Correlation matrix: IIR, cost of equity, share price volatility, earnings-to-price ratio and realised returns

Panel A	**Full sample**	**Market cap>median**	**Market cap<median**
	N = 85	N = 42	N = 43
Cost of equity (before SSP)	0.05	**0.32**	-0.05
Share price volatility	**-0.35**	0.18	-0.19
Panel B	**Full sample**	**Market cap>median**	**Market cap<median**
	N = 71	N = 40	N = 31
Earnings-to-price ratio	-0.09	0.10	0.05
Panel C	**Full sample**	**Market cap>median**	**Market cap<median**
	N = 58	N = 35	N = 23
Realised returns	-0.06	-0.22	-0.04

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

This positive association provides some support for the argument raised by the Financial Executives Institute (Berton, 1994) that increased disclosure will increase share price volatility and therefore risk, resulting in an increased cost of equity. Share price volatility is a widely accepted measure of a share's total risk. This total risk can further be split into two parts, market or systematic risk and unique or non-systematic risk (Gopi, 2016: 4). As discussed in Section 8.2, share beta is a measure of systematic risk and an important variable in the CAPM.

Although Table 8.11 shows a negative association between IIR and share price volatility for the full sample, the positive (although not significant) association for the larger company sub-sample and the negative (although not significant) association for the smaller company sub-sample did provide some further support for the argument that disclosure would increase share price volatility, resulting in an increased cost of equity, although only for the larger company sub-sample.

Besides an increased share price volatility, some studies have reasoned that a positive association between disclosure and the cost of equity may be caused by the specific disclosure content (e.g. good news or bad news) (Kothari *et al*., 2009), or by the perceived credibility of disclosure (Francis *et al*., 2005a), or as a result of the fact that the cost of disclosure exceeds the benefits thereof (Liu and De Villiers, 2011). More specifically to investor relations, Agarwal *et al.* (2016: 31) argued that simply 'repackaging' and communicating existing disclosures may have no incremental value and, if the cost thereof is significant, will adversely affect shareholders' interest.

All other correlation coefficients in Table 8.11 were not significant. Stepwise regressions were performed using the cost of equity (before SSP), the earnings-to-price ratio and realised returns, as dependent variables, and the independent variables as listed in Table 8.4. For all three of these dependent variables, three regressions were done: the full sample, the small company sub-sample and the large company sub-sample, therefore nine stepwise regressions in total.

Of these nine regressions, IIR remained as significant independent variable in only one stepwise regression model, namely the regression model where realised returns was the dependent variable and for the full sample (as discussed in Section 8.2 the sample of 85 was reduced to 58 for realised returns as a result of not using negative returns). The results are shown in Table 8.12.

Table 8.12: Regression results: regression of realised returns on IIR and other significant independent variables

	Realised returns (N = 58)
$\beta 0$	**20.476**
Internet investor relations (IIR)	**-0.084**
Market-to-book ratio (MTB)	**7.195**
Dual listing (LIST.D)	**9.479**
Adjusted R^2 (%)	14.094%
F-value	4.117
Durbin-Watson	1.747

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

Although the adjusted R^2 was only 14% and both the market-to-book ratio and dual listing coefficients positive, and not negative as expected for a cost of equity proxy, the statistically significant negative association (although only at 10%) did provide some evidence of a negative association between IIR and the cost of equity, notwithstanding the fact that realised returns were viewed as a noisy cost of equity proxy in the literature, as discussed in Section 8.2. This further raises a question about the reliability of the cost of equity (before SSP) based on the CAPM as valid cost of equity proxy.

Table 8.2 shows 36 companies with one or more non-trading days. As discussed in Section 8.5.1, only one company in the zero non-trading days category had a negative beta. As robustness check, these 36 companies were removed. With the cost of equity (before SSP), the earnings-to-price ratio and realised returns, as dependent variables, and the independent variables as listed in Table 8.4, three further stepwise regressions were performed. For none of the three regressions did IIR remain a statistically significant independent variable.

Finance textbooks distinguish between the levered and unlevered beta. The market betas are calculated using the underlying share returns, which are generated by the existing capital structure of the company (which may or may not include debt). The beta as captured from BNP Paribus is therefore the levered beta. Levered betas capture both financial and market risk (Botosan & Plumlee, 2005: 34). The Hamada formula for unlevering betas is described in standard finance textbooks (e.g. Correia *et al.*, 2013: 7-20).

According to the Hamada formula, the unlevered beta is calculated as follows:

$$\frac{Levered\ beta}{[1+(1-Tax\ rate)x\left(\frac{D}{E}\right)} \quad (8.5)$$

where:

$Tax\ rate$ = corporate tax rate (28%);

D/E = Debt to equity ratio.

Both cost of equity (before SSP) and cost of (equity after SSP) in this study were calculated using the levered beta. As robustness check, the cost of equity (before SSP) was re-calculated using the unlevered beta. Results remained unchanged.

8.6.3.2 Cost of equity (after SSP)

The rationale of a small share premium (SSP) adjustment was discussed in Section 8.5.1. Table 8.13 shows the Pearson correlation coefficients between IIR and the cost of equity (after SSP) for the full sample, the small company sub-sample and the large company sub-sample.

Table 8.13: Correlation matrix: IIR and the cost of equity (after SSP)

	Full sample	**Market cap>median**	**Market cap<median**
	N = 85	N = 42	N = 43
Cost of equity (after SSP)	**-0.34**	**0.32**	**-0.34**

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

As the SSP adjustments had affected only companies in the small company sub-sample, the Pearson correlation coefficient between IIR and both the cost of equity (before SSP) and cost of equity (after SSP) remained unchanged from Table 8.11 to 8.13 for the larger company sub-sample. For the small company sub-sample, however, IIR was now significantly and negatively related to the cost of equity (after SSP) for both the full sample and the small company sub-sample.

Table 8.14 presents the multivariate regression results of the stepwise regressions that were performed using the cost of equity (after SPP), as dependent variable, and the independent variables as listed in Table 8.4. For the larger company sub-sample, IIR was found to be non-significant.

Table 8.14: Regression results: regression of the cost of equity (after SSP) on IIR and other significant independent variables

	Cost of equity (after SSP)	Cost of equity (after SSP)
	Full sample	**Market cap<median**
	N=85	N=43
$\beta 0$	**0.1529**	**0.1948**
Internet investor relations (IIR)	**-0.0002**	**-0.0004**
Share price (SP)	**-0.0181**	**-0.0239**
Leverage (LEV)	**0.0485**	**0.0536**
Market-to-book ratio (MTB)	**-0.0074**	**-0.0110**
Industry (IND)	**0.0446**	**0.0338**
Adjusted R^2 (%)	59.05%	71.07%
F-value	25.226	21.633
Durbin-Watson	1.858	2.017

Notes: Green = significant at the 1% level; Blue = significant at the 5% level

As Table 8.14 shows, IIR was negative and statistically significantly related to the cost of equity (after SSP) for both the full sample and the small company sub-sample. As expected, it remained non-significant for the larger company sub-sample as these companies were unaffected by the adjustments.

The direction of all other coefficients in Table 8.14 was as theoretically expected in Table 8.4. It was noteworthy that leverage was highly significantly and positively related, as expected, as opposed to the negative Pearson correlation between leverage and both the cost of equity (after SSP) and the earnings-to-price ratio that were portrayed in Table 8.6.

The magnitude of the reported adjusted R^2 of 59.05% and 71.07% compares favourably to studies such as Hail (2002) that reported an adjusted R^2 of 30.6%; Botosan (1997) that reported 13.5%; Froidevaux (2004) that reported 5.39%; Orens *et al.* (2010) that reported 41%; and Fu *et al.* (2012) that reported 14.93%.

As robustness check, the cost of equity (after SSP) was further re-calculated by (1) including the 0.7% risk premium adjustment for companies with a market capitalisation exceeding R2 000 million (see Table 8.3); (2) using the unlevered beta as discussed above (pages 250-251); and (3) applying only 50% of the SSP adjustments in Table 8.3. For all three scenarios, IIR remained a statistically significant and independent variable in all three stepwise regression models.

These results raise questions about both the reliability of share betas for smaller and less liquid companies and the ability of the CAPM to capture the specific risks associated with smaller companies (e.g. bankruptcy, ability to obtain equity and debt financing, and competition from larger and more established companies).

8.6.3.3 Cost of capital (before SSP)

Table 8.15 (Pearson correlation coefficients) shows a highly significant, and negative (as expected), association between both measures of the cost of capital (before SSP) (i.e. using both market values and book values) and IIR for the full sample. For the large and small company sub-samples the association was negative, but not statistically significant. These negative associations were mainly caused by the negative association between the cost of debt and IIR.

Table 8.15: Correlation matrix: IIR and the cost of capital (before SSP), cost of equity (before SSP) and cost of debt

Panel A	**Full sample**	**Market cap>median**	**Market cap<median**
	N = 85	N = 42	N = 43
Cost of capital (market value)	**-0.33**	-0.15	-0.18
Cost of capital (book value)	**-0.34**	-0.16	-0.14
Cost of equity (before SSP)	0.05	**0.32**	-0.05
Panel B	**Full sample**	**Market cap>median**	**Market cap<median**
	N = 68	N = 36	N = 32
Cost of debt (after tax)	**-0.29**	-0.20	-0.15

Notes: Green = significant at the 1% level; Blue = significant at the 5% level

As discussed in Section 8.1, the cost of debt is theoretically lower than the cost of equity. More specifically, the average cost of debt and cost of equity used in calculating the cost of capital as depicted in Table 8.15 were respectively 8.11% and 11.92%. As further discussed in Section 8.1, cost of capital would therefore theoretically decrease as the proportion of interest-bearing debt in the capital structure increased, but only up to a point, after which the increased financial risk would result in an increased cost of debt and cost of equity.

The McKenzie and Partington (2003) literature review showed that the relationship between the cost of equity and the cost of debt was unclear. This study, too, found no significant correlation between the cost of debt and the cost of equity (before SSP). However, the inability of the CAPM to correctly assess the risk of smaller companies may be a further reason for the absence of a significant association between the cost of equity (before SSP) and the cost of debt.

Table 8.16 shows the stepwise regression results using the independent variables as listed in Table 8.4. IIR was highly significantly, and negatively (as expected), related to both cost of capital measures. As discussed above, this negative association was mainly caused by the significant negative association between the cost of debt and IIR, as discussed above and in Chapter 7.

The direction of all other coefficients was as theoretically expected in Table 8.4. The statistically significant negative coefficient of dual listing, although only at 10%, is noteworthy. This provides some support for the argument that one of the advantages of having a dual listing is a lower cost of capital. For both the large and the small company sub-samples, IIR did not remain in the stepwise regression model as a significant independent variable.

Table 8.16: Regression results: regression of the cost of capital (before SSP) on IIR and other significant independent variables

	Full sample N = 85	
	Market value	**Book value**
$\beta 0$	**0.1008**	**0.0992**
Internet investor relations (IIR)	**-0.0002**	**-0.0002**
Equity growth (EQUIT)	**-0.0031**	
Dual listing (LIST.D)	**-0.0099**	**-0.0107**
Industry (IND)	**0.0275**	**0.0338**
Return on equity (ROE)		**-0.0003**
Adjusted R^2 (%)	29.62%	29.06%
F-value	9.837	9.604
Durbin-Watson	1.746	2.035

Notes: Green = significant at the 1% level; Blue = significant at the 5% level; Red = significant at the 10% level

8.6.3.4 Cost of capital (after SSP)

The cost of capital (after SSP) was calculated using the weighted average of the cost of debt and the cost of equity (after SSP), as discussed in Section 8.5.1. Table 8.17 shows the Pearson correlation coefficients between IIR and the cost of capital (after SSP) for the full sample, the small company sub-sample and the large company sub-sample.

Table 8.17: Correlation matrix: IIR and the cost of capital (after SSP)

	Full sample	**Market cap>median**	**Market cap<median**
	N = 85	N = 42	N = 43
Cost of capital (market value)	**-0.52**	-0.15	**-0.45**
Cost of capital (book value)	**-0.51**	-0.16	**-0.42**

Notes: Green = significant at the 1% level; Blue = significant at the 5% level

As expected (based on the regression results discussed in Sections 8.6.3.1 to 8.6.3.3), Table 8.17 shows a highly significant negative association between IIR and the cost of capital for both the full sample and the small company sub-sample. The increased significance compared to Table 8.15 was mainly caused by the use of the cost of equity (after SSP) in Table 8.17. The correlation coefficients for the larger company sub-sample, however, remained unchanged as only companies included in the small company sub-sample were affected by the SSP adjustments.

Table 8.18 presents the multivariate regression results of the stepwise regressions that were performed using the two measures of the cost of capital (after SPP) as dependent variables, and the independent variables as listed in Table 8.4. For the large company sub-sample, IIR did not remain in the stepwise regression model as significant independent variable.

For both the full sample and the small company sub-sample, IIR was highly significant, and negatively (as expected) related to both cost of capital measures. The direction of all other coefficients was as theoretically expected in Table 8.4. The statistically significant positive coefficient of leverage was noteworthy.

Table 8.18: Regression results: regression of the cost of capital (after SSP) on IIR and other significant independent variables

	Full sample N = 85		Market cap<median N=43	
	Market value	**Book value**	**Market value**	**Book value**
$\beta 0$	**0.1784**	**0.1824**	**0.2248**	**0.1710**
Internet investor relations (IIR)	**-0.0003**	**-0.0003**	**-0.0004**	**-0.0004**
Share price (SP)	**-0.0165**	**-0.0205**	**-0.0214**	**-0.0192**
Equity growth (EQUIT)	**-0.0028**		**-0.0034**	
Industry (IND)	**0.0237**	**0.0324**		
Leverage (LEV)				**0.0465**
EPS variability (EPS VAR)				**0.0081**
Adjusted R^2 (%)	50.00%	53.46%	46.57%	50.25%
F-value	22.004	33.166	13.204	11.604
Durbin-Watson	1.761	1.954	2.120	1.958

Notes: Green = significant at the 1% level; Blue = significant at the 5% level

Table 8.8 shows a negative Pearson correlation coefficient between the cost of capital and leverage, and it was reasoned (see Section 8.6.2) that this (unexpected) negative association may have been the result of the argument that the cost of debt is lower than the cost of equity. Although the dissertation asserted that the cost of capital would therefore decrease as leverage increased, it was further felt that this decrease would only hold up to a certain point. The positive coefficient of leverage in Table 8.18 therefore supported the related capital structure finance theories.

8.7 SUMMARY AND CONCLUSION

The cost of capital – also named the weighted average cost of capital (WACC) – is the weighted average cost of equity and cost of debt. It is therefore the average cost at which a company can raise the capital needed to maintain and grow its business operations. More specifically, a reduced cost of capital will, as hurdle rate for investment decisions, increase both the number of investments that will be assessed as profitable and the profitability of those projects for companies. Further, the cost of capital used in a discounted cash flow model can have a significant effect on the value of a company. Overall, a lower cost of capital is highly desirable for companies.

In Chapter 7, a statistically significant negative association was found between IIR and the cost of debt. The association between disclosure and the cost of equity can be examined either through a direct examination of the effect of disclosure on the cost of equity or, alternatively, through an indirect

examination of the effect of disclosure on information asymmetry. In Chapter 6, the indirect route was examined and a statistically significant negative association was found between IIR and information asymmetry for four of the five information asymmetry proxies that were used.

The purpose of this chapter, as discussed in Section 1.4.1, was to examine the relationship between IIR, and the cost of equity and the cost of capital, the sixth and seventh research objectives of this dissertation. This was done through a direct examination of the effect of IIR on each.

Although the dissertation did consider *ex ante* cost of equity estimate methods, it was considered not achievable in this study, as discussed in Section 8.2. In this chapter, the CAPM was used as proxy to estimate the cost of equity as a subsequent component in the cost of capital calculation. The CAPM is also the preferred cost of equity proxy in practice in South Africa (PwC, 2015).

Two alternative, but noisy, cost of equity proxies – the earnings-to-price ratio and realised returns – were also considered, but not used to calculate the cost of capital.

As per Formula 8.1, share beta is an important variable in using the CAPM. Criticism against the use of the CAPM was discussed in Section 8.2. The reliability of the CAPM in estimating the cost of equity for smaller companies is specifically criticised for two reasons. Firstly, smaller companies are often thinly traded (e.g. Table 6.11 showed a highly significant positive correlation between share price and share turnover), resulting in a downward bias, that is a smaller beta and therefore a lower cost of equity. Secondly, as discussed in Section 8.2, the share beta only captures systematic risk. As mentioned in Section 8.5.1, there are other risks besides systematic risk that are associated with smaller companies, but are left unexplained by the CAPM. Further, the Fama-French three-factor model, as discussed in Section 2.6.2.3, shows that smaller companies tend to outperform the market.

In support of the premise that the CAPM will underestimate the cost of equity for smaller companies, the overwhelming majority of financial analysts and corporate financiers in South Africa adjust the cost of equity for smaller companies by adding a small share premium (SSP) (PwC, 2015). The regression analysis in this chapter started off with an examination of the cost of equity (before SSP) and no significant association between IIR and the cost of equity (before SSP) was found. Using stepwise regression model-building, a significant negative association was found between IIR, as independent variable, and the cost of equity (after SSP), after controlling for the share price, leverage, the market-to-book ratio and industry membership. The level of statistical significance of the IIR coefficient increased from 5% to 1% in a separate analysis of companies with a market capitalisation smaller than the median market capitalisation of the study sample.

Although IIR did not remain as a statistically significant independent variable in a separate regression analysis for a larger company sub-sample (i.e. companies where the market capitalisation exceeded the median sample market capitalisation), a bivariate analysis showed, contrary to expectation, a significantly positive association between IIR and the cost of equity (after SSP) for the larger company sub-sample. For the reason that only the small company sub-sample was affected by the

SSP, Table 8.11 shows the same positive association between IIR and the cost of equity (before SSP). Although not as hypothesised, several studies have shown a similar positive association. Theoretical arguments for such a positive association were discussed in Section 8.6.3.1.

The seventh, and final, research objective was to examine the association between IIR and the cost of capital. As discussed in Section 8.3, the cost of capital was calculated as the weighted average of the cost of equity and cost of debt. This study used both the market value and the book value of equity and debt.

A significant negative association was found between IIR, as independent variable, and the cost of capital (before SSP) irrespective of the method used to assign weights (i.e. the book or market values). The dissertation has argued, given the non-significant association found between IIR and the cost of equity (before SSP), that this negative association is the result of the significant negative association between IIR and the cost of debt found in Chapter 7. Separate regression analyses of the small and large company sub-samples showed no similar association between IIR and the cost of capital (before SSP).

Finally, cost of capital was calculated using the cost of equity (after SSP) instead of the cost of equity (before SSP) that was used to calculate the cost of capital (before SSP). Again, IIR was found highly statistically significant and negative, as expected, irrespective of the method used to assign weights. A similar negative association between IIR and the cost of capital (after SSP) was found for a smaller company sub-sample.

The main contributions of this chapter can be summarised as follows. Firstly, the results suggests that the ability of the CAPM to reliably assess the cost of equity for smaller companies should be questioned. Secondly, results pointed toward the existence of a possible non-linear relationship between IIR and the cost of equity. Lastly, the results suggested that companies may benefit from both a reduced cost of equity and cost of capital through an enhanced policy of IIR in the context of a developing country. To the best knowledge of the dissertation, this is the first study in a South African context that has examined the association between the IIR and the cost of capital.

One possible limitation of the analysis in this chapter is the use of only one *ex post* estimate (i.e. CAPM) of the cost of equity and the cost of capital. Although it was not considered possible to make *ex ante* estimates in this chapter, Collins and Abrahamson (2006: 72) argued that the most sensible and robust approach to measuring the cost of equity in an emerging country (like South Africa) is to calculate the cost of equity as the average of a number of estimates derived from various estimate techniques. Another possible shortcoming is the use of a local CAPM instead of a global CAPM, specifically for the dual-listed companies in the study sample. A global CAPM involves the use of an international risk-free rate and an international market risk premium, as well as the application of a global instead of a local market index to calculate the beta coefficients.

CHAPTER 9
SUMMARY AND CONCLUSION

9.1 SUMMARY OF RESEARCH PROBLEM

Accounting standards boards, professional auditing firms and investor relations professionals often claim decreased cost of capital as one of the benefits of a well-developed and well-implemented disclosure policy and investor relations strategy. Others, however, have argued that enhanced disclosure levels would increase share price volatility, resulting in an increased cost of equity. Some researchers further contend that investor relations as the mere repackaging and communication of existing information may have no incremental value in decreasing the cost of capital.

The association between voluntary annual report disclosure and both information asymmetry and the cost of capital have been extensively researched globally. Owing to the laboriousness of the task of a manual content analysis, numerous studies have used an indirect disclosure proxy, for example analyst ratings.

The vast majority of studies that have examined the corporate website as disclosure vehicle could be classified as either a descriptive or determinant study. Few of these studies made any attempt to measure widely enough to embrace a measurement of investor relations, and specifically Internet investor relations (IIR). Investor relations is a much wider concept than mere financial statements. Marston (1996), for example, defined investor relations as the link between a company and the financial community in terms of which information is provided to the financial community for evaluating the company.

Limited research has been conducted on IIR in South Africa. The purpose of this study was to investigate the quality of the corporate website for investor relations purposes in South Africa, to establish the determinants thereof, and to establish whether the use thereof has any effect on the level of information asymmetry and the cost of capital.

Economic theory suggests two distinct routes in support of the hypothesis that IIR could decrease the cost of equity, the liquidity route and the estimation risk route. With the liquidity route, it is generally argued that an enhanced IIR policy will increase liquidity, which will result in a decrease in the cost of equity, either through reduced transaction costs or an increased demand. The estimation risk route is associated with the investors' assessments of the parameters of the expected return. Both the reduced estimation risk route and the increased liquidity route are based on a reduction of information asymmetry.

Information asymmetry was described in this dissertation as the situation where some investors have private information (i.e. informed traders), while others only have publicly available information (i.e. uninformed traders). The level of information asymmetry depends on the balance between the informed and the uninformed. Increased IIR can decrease information asymmetry, either by

discouraging private information search activities (and therefore private information) or by decreasing the relative amount of privately informed trading (i.e. relative to uninformed trading).

One way to hypothetically decrease the relative amount of privately informed trading is to increase the level of uninformed trading. The investor recognition hypothesis is that uninformed investors are more likely to invest in companies with which they are familiar. Enhanced IIR can potentially improve the visibility of companies and attract more uninformed trading. An increased proportion of uninformed trading will decrease the probability of trading with a better informed investor and as a result, the need for investors to price protect themselves by adjusting their bid (buy) and ask (sell) prices away from the market. In theory, such price protection is said to widen the bid-ask spread, increase transaction cost, decrease liquidity, and ultimately increase the cost of capital.

Although the majority of empirical studies showed a negative association between disclosure/investor relations and both information asymmetry and the cost of capital, the literature is far from reaching a consensus; and numerous studies have found no or even positive associations.

The research problem of this study was: Will variations in IIR between companies have any effect, positive or negative, on the level of information asymmetry and cost of capital? The research problem was addressed by answering three research questions. The research problem and research questions were addressed via seven research objectives.

The remainder of this chapter is organised into four distinct sections as follows. Firstly, Section 9.2 discusses the seven research objectives that were set for this study. Next, recommendations are made on how companies can improve their IIR (Section 9.3), followed by a discussion on the contributions made by this study (Section 9.4). To conclude, the limitations of this study, with suggestions for future research are discussed in Section 9.5.

9.2 RESEARCH OBJECTIVES

9.2.1 First objective: the development of a measurement instrument to measure the extent of Internet investor relations

Although no standards currently exist to regulate IIR, best practice corporate website guidelines to help companies communicate more effectively with investors and other stakeholders are published annually by the Investor Relations Society. Based on these guidelines, core attributes were identified to develop a measurement instrument to measure IIR. To ensure that this instrument measured as widely as possible (i.e. to mitigate the risk of important attributes being omitted), to improve comparability with the literature, and for guidance on how to measure specific attributes, these core attributes were further supplemented following an extensive literature review.

Finally, a pilot study was done to evaluate the practicality of measuring the attributes as selected, to identify any omitted attributes that may be applicable only in the South African environment, and for further guidance on how to measure specific attributes.

The result was an extensive measurement instrument that consisted of 346 attributes, organised into 11 categories (number of attributes are given in brackets): accessibility (13), navigation (14), timeliness (12), company information (36), financial information (65), relevant news (23), investment case (26), shareholder information (60), bondholder information (5), corporate governance (50) and corporate responsibility (42). The complete list of attributes that were measured are given in Annexure D.

Although the reliability and validity of the measurement instrument were finally assessed only after all measurements were completed (i.e. after research objective two, as discussed below), the assessment thereof is discussed here for practical reasons. Reliability (i.e. internal consistency) was assessed using Cronbach's alpha and by examining the relationships (i.e. correlation coefficients) between the total IIR score per company and the measurement instrument categories (e.g. financial information and corporate governance). Overall, these tests confirmed the reliability of the measurement instrument. Construct validity was used to validate the use of the measurement instrument. The statistically significant correlations, all directions being as theoretically expected, between IIR and size, leverage, listing status, financing activities and ownership structure confirmed the validity of the measurement instrument. Reliability and validity were discussed in Sections 3.2.8, 3.3.6 and 4.5.

9.2.2 Second objective: to measure the extent of Internet investor relations scores

Stratified random sampling with proportional allocation (using JSE industry membership) was used to select a sample of 85 companies from a population of 315 companies. The population was defined as all companies currently listed on the JSE that had not been suspended, had traded since inception date, had published 2013 annual reports, and had a dedicated, working website. The 85 corporate websites were assessed from March to September 2015 using the measurement instrument in Annexure D.

For each company, an IIR score was calculated by adding the scores of the 346 attributes together. Although the majority of attributes were measured as either available (1) or absent (0), 50 attributes were measured as partially available (0.5), based on the breadth and depth of content available. Non-functional and unuseful links were assessed as absent (0). Outdated information was assessed as either partially available (0.5) or absent (0). Where information was available, but as a result of factors such as poor layout, inconsistencies and incompleteness was not fully useful, the attributes were assessed as partially available (0.5). Measurement conventions followed are specifically discussed in Annexure C and Chapter 4. As discussed in Section 1.3.2, for the purpose of this study, IIR is defined as to refer to the quality of IIR.

The results of the measurement process were discussed by means of both a vertical and horizontal analysis. The vertical analysis entailed the calculation of an average availability per attribute measured and the horizontal analysis the calculation of an IIR score per company. Overall, the

majority of companies did not use corporate websites optimally to communicate with investors. In Section 4.6.1, possible reasons for low IIR scores were discussed and, in Section 9.3, suggestions are made on how companies can improve their IIR.

9.2.3 Third objective: to establish the determinants of Internet investor relations

In Chapter 2, theories that were used in the literature to explain the disclosure policies followed by companies were discussed, namely the agency problem, information problem, signalling theory, investor recognition hypothesis, follower's effect, and cost–benefit analysis. Based on these theories, various company-specific characteristics were developed and tested in the literature to explain disclosure levels.

From the literature, this study identified the following company characteristics that could explain variations in IIR levels: company size, leverage, the current ratio, financial performance (return on equity), market-to-book value, number of years listed, directors' shareholding percentage, free float percentage, financing activities (i.e. issue or buy back of shares), auditors, industry membership, dual listing status, primary listing and the existence of block ownership.

Stepwise regression was applied to establish the determinants of IIR by means of a regression model linking the IIR score per company to selected explanatory variables (i.e. company characteristics listed in the paragraph above). The following were found to be significant independent variables as determinants of IIR: company size, leverage, being audited by a big four audit company, JSE industry membership, free float percentage and dual listing status.

More specifically, larger companies, companies with more debt, companies that are audited by a big four audit company, companies with a higher free-float percentage (i.e. fewer restricted shares) and, lastly, companies that were dual-listed had higher IIR scores. Companies that were members of one of the following four JSE industries, namely consumer services, consumer goods, financials, and technology, each had a lower IIR score compared to companies listed in one of the other nine industries. Signalling theory (Aly *et al.*, 2010) and the 'follower's effect' (Lybaert, 2002) have been used in the literature to explain an association between industry type and disclosure.

9.2.4 Fourth objective: to examine the relationship between Internet investor relations and information asymmetry

Information asymmetry is said not only to increase transaction costs and decrease liquidity, but also to diminish the quality of the investment decisions taken by investors, thus weakening the overall functioning of markets. As information asymmetry is not directly observable, five proxies were used in this study. As discussed in Chapters 2, 6 and summarised above in Section 9.1, increased disclosure levels should theoretically decrease information asymmetry levels. Besides the IIR score, as measured in this study, additional variables used in the literature to explain variations in information asymmetry levels were identified.

Stepwise regression was applied and a statistically significant negative association was found between IIR and information asymmetry for four of the five information asymmetry proxies that were used: bid-ask spread, price impact, share turnover, and analyst following. The first two proxies were positively related to information asymmetry and the last two were negatively related. More specifically, increased levels of IIR were found to decrease the bid-ask spread and price impact, and increase share turnover and analyst following. IIR was, however, not found to be a statistically significant independent variable in explaining variations in share price volatility.

Overall, the results suggested that companies may potentially benefit from a well-developed IIR strategy through decreased information asymmetry. Regression models explained 51%, 54%, 90% and 91% of the variations in the share turnover, analyst following, price impact and bid-ask spread, respectively. The Wu-Hausman test statistic confirmed the absence of endogeneity in all four regression models.

9.2.5 Fifth objective: to examine the relationship between Internet investor relations and the cost of debt

The cost of debt is the cost at which a company can borrow money from creditors. Hypothetically, the cost of debt is equal to the risk-free rate plus a risk premium to compensate creditors for default risk. Default risk, as assessed by creditors, is, among others, a function of the probability that the company is withholding unfavourable information. A well-developed IIR programme can therefore theoretically decrease the cost of debt if it could decrease this assessed probability.

For the purpose of this study, the cost of debt was measured as the interest expense for the year, scaled by the average interest-bearing liabilities. Besides the IIR score, additional variables used in the literature to explain variations in the cost of debt were identified.

Stepwise regression was applied and a statistically significant negative association was found between IIR, as independent variable, and the cost of debt, as dependent variable. Although the explanatory power of the regression model was very low (adjusted R^2 of 14%), the adjusted R^2 compared favourably with previous disclosure–cost of debt studies. The Wu-Hausman test statistic confirmed the absence of endogeneity.

9.2.6 Sixth objective: to examine the relationship between Internet investor relations and the cost of equity

The cost of equity is the rate of return required by shareholders before they invest in a company. Companies will primarily benefit from a decreased cost of equity through a decreased financing cost. As with information asymmetry, the cost of equity is not directly observable and the credibility of any research that is based upon the cost of equity will therefore depend on the reliability of the cost of equity proxy that was used. Owing to data limitations, this study has primarily used the capital asset pricing model (CAPM) to estimate the cost of equity.

The CAPM is often criticised for the assumptions on which it is based. These criticisms, as discussed in Sections 8.2 and 8.5.1, are summarised in Section 9.5.3. Notwithstanding all disapprovals, the CAPM is still by far the most popular cost of equity estimate used in South Africa by financial analysts and corporate financiers (PwC, 2015). Based on a PwC valuation report (PwC, 2015), the cost of equity of companies with a market capitalisation less than R2 000 million was adjusted by adding a small share premium (SSP).

Besides the IIR score, additional variables used in the literature to explain variations in the cost of equity were identified. Stepwise regression was applied and a significant (at the 5% level) negative association between IIR, as independent variable, and the cost of equity (after SSP) was found. IIR, together with share price, leverage, the market-to-book ratio and industry membership, explained 59% (i.e. adjusted R^2) of the variation in the cost of equity (after SSP). The adjusted R^2 compared favourably with previous disclosure–cost of equity studies. The Wu-Hausman test statistic confirmed the absence of endogeneity.

A separate analysis of two sub-samples, namely a large company sub-sample comprising 42 companies and a smaller company sub-sample comprising 43 companies, was done. The median market capitalisation of the sample of 85 companies was used to create the two sub-samples. For the large company sub-sample, IIR was found non-significant, but for the small company sub-sample, the IIR coefficient was negative and highly significant at the 1% level. This non-significant association for the large company sub-sample opposed to the significant association for the small company sub-sample, suggests the existence of non-linear relationships as discussed in Section 8.5.4.

The small company sub-sample regression model (also including IIR, share price, leverage, the market-to-book ratio and industry membership, as independent variables) explained 71% (i.e. adjusted R^2) of the variation in the cost of equity (after SSP).

Excluding the small share premium (SSP), IIR was found to be non-significant in all multiple regression models (i.e. for the full sample and the two sub-samples). A bivariate analysis, on the other hand, found a positive and significant (at the 5% level) correlation coefficient for the large company sub-sample and a negative, but non-significant, correlation coefficient for the small company sub-sample. These results provide some support for the notion of a non-linear relationship between IIR and the cost of equity, as discussed in Section 8.5.4. Although the positive correlation coefficient is contrary to what was expected, it confirmed previous studies that found a similar positive association. Possible reasons for this were discussed in Section 8.6.3.1.

9.2.7 Seventh objective: to examine the relationship between Internet investor relations and the cost of capital

Cost of capital – also named the weighted average cost of capital (WACC) – is the weighted average cost of equity and cost of debt. This study used both the market value and the book value of equity

and debt to assign weights, as well as the cost of equity (before SSP) and the cost of equity (after SSP), resulting in four cost of capital measures: cost of capital (book value) (before SSP), cost of capital (market value) (before SSP), cost of capital (book value) (after SSP), and cost of capital (market value) (after SSP). To test for indications of a non-linear relationship, regression tests were further performed for the full sample, a small company sub-sample and a larger company sub-sample, and discussed in Section 9.2.6.

A highly significant (at the 1% level) negative association between IIR, as independent variable, and the cost of capital (after SSP) was found for the sample of 85 companies, irrespective of how weights were assigned (i.e. using market value or book value). A similar negative association was found for the small company sub-sample, but not for the large company sub-sample.

Excluding the SSP adjustment to the cost of equity, an examination of the association between IIR and the cost of capital (before SSP) showed a similar highly significant negative association (at the 1% level) between IIR, as independent variable, and the cost of capital (before SSP), also irrespective of how weights were assigned. The dissertation has, however, argued that this negative association is the result of the negative association between IIR and the cost of debt, given the results in Chapter 8 that found no significant negative association between IIR and the cost of equity (before SSP) in any multiple regression model. Further, for both the large and small company sub-samples, IIR was found non-significant in explaining variations in the cost of capital (before SSP), using stepwise regression.

The explanatory power of the regression models were significantly lower in explaining variations in the cost of capital (before SSP) (30% and 29% for market value- and book value-based calculations, respectively) compared to the cost of capital (after SSP) (50% and 53% for market value- and book value-based calculations, respectively). Again, this was expected given the results found in Chapter 8, namely the non-significant association between IIR and the cost of equity (before SSP).

9.3 RECOMMENDATIONS ON HOW COMPANIES CAN IMPROVE INTERNET INVESTOR RELATIONS (IIR)

As discussed in Chapter 4, the majority of companies examined did not use their corporate websites optimally to communicate with investors. While the results of the measurement process and possible reasons for the somewhat lower than expected average IIR scores were discussed in Sections 4.3 and 4.6.1 respectively, the purpose of this section is to make suggestions on how companies can improve their IIR.

Some corporate websites were, however, clearly neglected, as evidenced by the amount of outdated information and the number of non-functional links. As a minimum, companies must ensure that: 1) all information subject to regular change (e.g. market capitalisation, history, financial calendar, shareholder analysis, principal shareholders and the list of directors) is continuously updated; 2) only the latest documents (e.g. BBBEE certificates and King III compliance schedules) are published or

clearly labelled as archived if not the latest; 3) links to the “latest” information are in fact the latest (e.g. links to annual reports for information must be updated if more recent annual reports are already available and published on the website); and 4) all links are functional and that non-functional links are removed (e.g. non-functional links to third party websites for further information).

To improve the usability of information, all documents must be dated, with the ‘date last updated’ provided throughout the corporate website. The use of presentation technologies, such as an e-mail alert service, RSS content feed, the option to sync calendars and dedicated links/sections to the ‘latest information’, will ensure that users are always aware of the latest available information.

Website traffic can potentially be improved by 1) using a unique URL and/or optimising the website search engine ranking; 2) ensuring that both .co and .com extensions are functional (where feasible); 3) using social media channels such as Twitter with links to the corporate website for further information; 4) promoting the corporate website as information source in the integrated annual report; and 5) improving the accessibility the corporate website for users with specific impairments (e.g. deafness) or preferences (e.g. some investors prefer HTML and others PDF, as discussed in Section 3.2.3.4). Some basic steps that companies could follow to improve accessibility to these users are to refrain from the excessive use of graphics without a text-only option; to make use of alternative forms (e.g. transcripts and podcasts); to optimise content for screen readers (e.g. short and descriptive headings); and to provide an option to adjust font size.

Throughout this dissertation it was argued that, although many of the attributes measured were also available from other sources or even elsewhere on the corporate website, but locked away somewhere (e.g. inside a PDF document), it is often inconvenient, costly or time-consuming for investors to access information. The majority of companies can significantly improve the accessibility of information which is either locked away in reports or somewhere on the website, or readily available on a third party website by 1) duplicating the information in HTML, or offering dedicated and descriptive downloadable documents, or providing dedicated and descriptive links; 2) providing a search function or sitemap; 3) providing a search or filter option for news items and annual report content; 4) providing options to customise information (e.g. customised annual report, share price history and financial ratios); and 5) using internal hyperlinks effectively (e.g. drill down links and linking HTML financial statements to notes).

Further, to avoid users getting lost on websites (i.e. becoming disoriented), users should be given an easy way to know where they are on the website (e.g. through the use of a breadcrumb trail or navigation panel) and a ‘back to the homepage’ link should be clearly visible on all pages.

Although the cost of providing attributes will differ from attribute to attribute and from company to company, examples of attributes that companies can upload with little additional cost or effort include attributes such as: PDF slides of annual and interim results presentations; financial calendars of upcoming events; and dividend and company history.

Alternative formats to PDF financial statements (e.g. dedicated online mini results sites where annual results are provided in HTML format) will involve some costs and time to develop. As a minimum, companies could provide internal hyperlinks to relevant sections inside PDF annual reports to promote access to attributes that are usually available inside integrated reports (e.g. financial ratios, highlights, shareholder information, names of board of directors, names of board committees, environmental reports, employee information, and critical success factors).

Management access and company visibility are key drivers of the success of an investor relations programme (Bushee & Miller, 2007). Overall, companies can make it easier for investors to contact or request information by: 1) providing a dedicated investor relations contact e-mail address and, where possible, the name of the person that can be contacted and his or her job title; 2) providing a manual (with a descriptive title) to facilitate access to information (e.g. in terms of the PAIA Act); and 3) providing a shareholder communication or stakeholder relationship policy.

9.4 CONTRIBUTIONS OF STUDY

The measurement instrument that was used in this study is primarily based on best practice guidelines as issued by the Investor Relations Society, but was further improved for the purposes of this study through an extensive literature review and pilot study. Reliability and validity tests were performed using the measurement results of 85 JSE-listed companies. Measurement conventions followed in measuring companies are described in Annexure C. Given the methodology that was followed in the development of the measurement instrument, the instrument itself may serve as a useful contributor to investor relations literature.

The results of the study moreover contribute to investor relations literature, specifically in providing further support for the investor recognition hypothesis. The results of this study suggest that a well-developed IIR programme may increase the visibility of a company, resulting in an increased share turnover and analyst following and a decreased bid-ask spread and price impact, all pointing towards improved liquidity.

According to Allen and Morris (2001: 17), finance can be broadly divided into two fields: asset pricing, which is concerned with the decisions of investors, and corporate finance, which is concerned with the decisions made by companies. Information asymmetry, cost of debt and the cost of equity are all concerned with investor decisions. As discussed in Section 8.1 companies use the cost of capital for a variety of reasons.

This study therefore contributes to international finance and economics literature by providing further evidence in support of economic theory that depicts a relationship between disclosure, and information asymmetry, cost of debt and cost of equity, using developing country data and through the examination of corporate websites as communication medium.

Some researchers found that annual report disclosure levels are positively correlated with the disclosure levels provided through corporate investor relations and other publications (Lang & Lundholm, 1993). As discussed, IIR is unregulated and primarily voluntary in nature. This study contributes to international accounting literature by providing further support for the advantages of voluntary disclosure in an accounting context. An understanding of IIR is also important for standard setters, for example professional accountancy bodies such as the IASB and the FASB.

Given the advantages of a reduced level of information asymmetry and cost of capital for companies, knowledge about the circumstances under which and how these may be achieved would enable companies to optimise their IIR strategies. Following the results of the measurement process, as discussed in Section 4.3, recommendations were made in Section 9.3 on how companies can improve their IIR. This study therefore also contribute to practice (i.e. listed companies, website developers and regulators).

9.5 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

9.5.1 Alternative information sources and communication channels

Besides using the company as information source, investors can also obtain information through a variety of information intermediaries. Chapter 1 argued that the proliferation of information sources have driven users closer to the company as information source. In addition to corporate websites, a wide variety of communication channels is available to companies, such as the integrated annual report, investor presentations, and social media channels (e.g. Twitter, Facebook and YouTube).

This study has investigated the association between IIR and both information asymmetry and the cost of capital, based on the underlying assumption that, given the advantages of corporate websites as communication medium (as discussed in Chapter 1), corporate websites will be the preferred investor relations communication channel and information source for companies and investors, respectively. All other communication channels used by companies, as well as information provided by information intermediaries, have therefore been excluded.

Users of company information and corporate websites vary from the naïve decision maker, to the institutional investor and analyst, to creditors – each with unique information needs. This study made no attempt to distinguish between the information needs of the various users of information. Further research is needed to ascertain to what extent the information available on corporate websites fulfils the information needs of specific investors and creditors. Turel (2010) used Turkish data to examine whether an expectation gap exists between the information perceived to be important by investors and the information that companies disclosure on their corporate websites. Turel (2010) did a survey in which financial analysts were asked to choose the most important 15 items from a list of 51 items to ascertain the perceived importance of information to investors. Allam (2005) used web server logs to study how online reports were accessed by users. Requests that are made by users for information

on corporate websites (e.g. by clicking on a link to view specific information) are stored by servers in log files, known as web server logs (Allam, 2005: 5).

Given the recent growth in social media channels such as Twitter, Facebook and YouTube, further research is needed on how companies use social media to communicate with investors, and to examine the effect thereof on information asymmetry and the cost of capital. Blankespoor, Miller and White (2014), for example, found that the communication of company-initiated news via Twitter is associated with lower bid-ask spreads and higher liquidity.

9.5.2 The measurement instrument and the measurement process

Disclosure has both a 'news' and information asymmetry effect (Leuz & Verrechia, 2000: 99). The news effect, for example, refers to whether favourable or unfavourable information is disclosed. Although this study made no attempt to distinguish between favourable or unfavourable information, such a distinction may be important, given the results found by, for example, Kothari *et al.* (2009). These authors found a positive association between unfavourable disclosure and each of the following: cost of capital, share price volatility, and earnings forecast dispersion. On the other, the same authors found a negative association between favourable disclosure and each of the following: cost of capital, share price volatility, and earnings forecast dispersion.

Given the laborious nature of the manual content analysis as was applied in this study, future research should consider following an automated approach using software packages (Hassan & Marston, 2010).

Further, as this study is not an investigation into the contents of annual reports and presentations of companies, the contents were not examined for the availability of attributes, unless dedicated and descriptive hyperlinks were provided to specific information within annual reports and presentations. Results reported in this study were therefore probably an underestimation of the actual content available to investors.

Some attributes measured by the instrument used in this study, for example information on debt-listed instruments, analyst reports, the carbon report and a discussion of work-related accidents, may not be applicable to all companies. No attempt was made by this study to distinguish between companies with respect to the relevancy or not of such attributes. Future studies should consider the calculation of a unique score per company by removing attributes which are not applicable for some companies, and then calculate their IIR using the lower score. For practicality, an alternative approach here would be to include only one or very similar industries in the sample.

This study did not separately analyse the association between the components of the measurement instrument (e.g. corporate governance) and both information asymmetry and the cost of capital. Future research may focus on specific areas, for example: the association between having a more timely, updated corporate website and information asymmetry, or the association between shareholder services (e.g. financial calendar and share charts) and liquidity.

9.5.3 Sample selection, and information asymmetry and cost of equity proxies

This study has specifically included all industries without excluding or stratifying for size, as well as dual-listed companies and companies with a primary listing other than the JSE, for a number of reasons as discussed in Section 4.2.1. The inclusion of dual-listed companies with a primary listing other than the JSE has to a certain extent impacted on the credibility of the ownership variable (20%.SH) that was calculated in Section 5.3.10. As these companies are governed by jurisdictions other than those governing only JSE-listed companies, information on main shareholders is not as readily available as for JSE-listed companies, as was thoroughly discussed in Section 5.3.10.

Moreover the inclusion of smaller companies that are less liquid and therefore associated with a downward (and sometimes negative) bias in share betas amplified the difficulty of using the CAPM as cost of equity estimate in this study. Analyst forecasts are also less easily available for smaller companies, contributing to a certain extent to the fact that it was not possible to use analyst forecast dispersion as information asymmetry proxy and *ex ante* estimate methods for the cost of equity. To overcome these limitations, future research can examine the association between IIR and these proxies by including only companies for which analyst forecast information is available in the study sample. On the downside, such studies will be biased for including only larger companies.

The statistically significant negative associations found between the dual-listed variable and both the bid-ask spread (Table 6.14) and the cost of capital (Table 8.16) are noteworthy. Future research including only dual-listed companies can provide further evidence for the notion that having a dual-listing will decrease the cost of capital.

9.5.4 Intraday-based information asymmetry proxies

Although the bid-ask spread is by far the most widely accepted information asymmetry proxy used in the literature, the specific version of the bid-ask spread that was used as proxy in this study is not without criticism and more refined versions based on intraday data are often used in the literature. The use of intraday data-based information asymmetry proxies (such as the time-weighted, effective and depth-adjusted effective spread) and spread decomposition models (such as the probability of informed trading) warrant future research on the association between IIR and information asymmetry.

9.5.5 Longitudinal studies and the use of lagged data

This study relied on only one IIR measurement per company and examined the association between IIR and both information and the cost of capital using only historical share data information. Considering that building an investor relations reputation and visibility take time, future research should include both longitudinal studies and the use of lagged data (e.g. the association between IIR in 2015 and information asymmetry in 2016).

9.5.6 The existence of non-linear relationships

The positive and significant correlation coefficient between the cost of equity (before SSP) and IIR for a large company sub-sample found in Chapter 8, as opposed to the negative, but non-significant, correlation coefficient for the small company sub-sample, provides some evidence for the existence of a non-linear relationship between the IIR and the cost of equity. Theories used in the literature to explain the existence of such a non-linear relationship were discussed in Section 8.5.4. Future research, using South African data, is needed to examine the existence of such a relationship.

9.5.7 Regulation of Internet investor relations

As discussed in Section 1.2.2, the decision to use the corporate website as investor relations communication channel is voluntary in the South African context. A consequence of this voluntary aspect is the significant cross-sectional variation in the use of corporate websites by companies as investor relations communication channel, as was found in Chapter 4.

Such cross-sectional variation may result in an overall decrease in the use of corporate websites as information source by investors. Investors may be discouraged to use corporate websites if all websites differ in respect of the type of information that is available and the way in which the information is presented. Another consequence of the voluntary nature of the use of websites is the negative impact it may have on the credibility of the information voluntarily disclosed thereon, given the conflicting incentives that companies will have (Healy & Palepu, 2001). Hedlin (1999) stated that “corporate reporting over the Internet becomes a problematic issue the day that it contains more information than traditional sources or when the time lag between Internet reporting and traditional means is reversed”.

According to the FASB (2001), one of the principles that guide the activities of standard setters is to issue standards only when the expected benefits exceed the perceived costs. The findings of this study suggest that a well-developed IIR strategy may increase liquidity and decrease the cost of capital. Not only companies will benefit from an increased liquidity and a decreased cost of capital, for example investors will draw advantage from the reduced likelihood that they will misallocate their capital. The generally economy, too will benefit from more liquid capital markets, from a more effective allocation of scarce resources (i.e. investment capital) and as a result of the investment effect of a lower cost of capital (FASB, 2001). This warrants research into whether IIR should be regulated or not, and, if regulation is deemed necessary, how it should be regulated?

The corporate websites of companies listed on the Alternative Investment Market (AIM) (as sub-market of the London Stock Exchange) are, for example, regulated in that each company listed on the AIM must maintain a website on which certain minimum information must be made available (LSE, 2016).

9.5.8 Value relevance

Value relevance research empirically investigates the usefulness of financial statements to equity investors. Beisland (2009: 9) defines value relevance as “the ability of financial statement information to capture and summarise information that determines the firm’s value”. The main objective of value relevance research is to study the relationship between market values of equity and accounting variables (Beisland, 2009). Future research may focus on the relationship between the market value of equity and IIR.

9.5.9 Standardisation

The use of standardised measurement instruments in psychological testing (e.g. IQ tests and personality tests) are well-known. Sauro (2012) lists the following eight advantages of using a standardised questionnaire (i.e. measurement instrument): reliability, validity, sensitivity, objectivity, quantification, economy, communication and norms. Future research may focus on the development of a standardised measurement instrument to measure IIR.

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ANNEXURE A: SAMPLE STUDIED

Table A1: Companies included in the sample studied

COMPANY	JSE CODE	JSE INDUSTRY
AECI Ltd	AFE	Basic Materials
African Oxygen Ltd	AFX	Basic Materials
Assore Ltd	ASR	Basic Materials
Firestone Energy Ltd	FSE	Basic Materials
Insimbi Refractory and Alloy Supplies Ltd.	ISB	Basic Materials
Rockwell Diamonds Inc	RDI	Basic Materials
Infrasors Holdings Ltd	IRA	Basic Materials
Hulamin Ltd	HLM	Basic Materials
Atlatsa Resources Corporation	ATL	Basic Materials
Harmony Gold Mining Company Ltd	HAR	Basic Materials
Evraz Highveld Steel and Vanadium Ltd	EHS	Basic Materials
Tawana Resources NL	TAW	Basic Materials
BHP Billiton plc	BIL	Basic Materials
Randgold & Exploration Company Ltd	RNG	Basic Materials
Sentula Mining Ltd	SNU	Basic Materials
Anglogold Ashanti Ltd	ANG	Basic Materials
Trans Hex Group Ltd	TSX	Basic Materials
Capevin Holdings Ltd	CVH	Consumer Goods
British American Tobacco plc	BTI	Consumer Goods
AH-Vest Ltd	AHL	Consumer Goods
Steinhoff International Holdings Ltd	SHF	Consumer Goods
Illovo Sugar Ltd	ILV	Consumer Goods
Distell Group Ltd	DST	Consumer Goods
Nu-World Holdings Ltd	NWL	Consumer Goods
Curro Holdings Ltd	COH	Consumer Services
Cashbuild Ltd	CSB	Consumer Services
Truworths Int Ltd	TRU	Consumer Services
Woolworths Holdings Ltd	WHL	Consumer Services
Clicks Group Ltd	CLS	Consumer Services
City Lodge Hotels Ltd	CLH	Consumer Services
Tsogo Sun Holdings Ltd	TSH	Consumer Services
Mr Price Group Ltd	MRP	Consumer Services
Pik n Pay Stores Ltd	PIK	Consumer Services
Nictus Ltd	NCS	Consumer Services

COMPANY	JSE CODE	JSE INDUSTRY
Arrowhead Properties Ltd	AWB	Financials
Dipula Income Fund Limited	DIA	Financials
Redefine International plc	RPL	Financials
Rockcastle Global Real Estate Company Ltd	ROC	Financials
Capital & Counties Properties plc	CCO	Financials
New Europe Property Investments plc	NEP	Financials
Growthpoint Properties Ltd	GRT	Financials
Hosken Consolidated Investments Ltd	HCI	Financials
JSE Ltd	JSE	Financials
Oasis Crescent Property Fund Ltd	OAS	Financials
Ecsponent Ltd	ECS	Financials
Discovery Ltd	DSY	Financials
Indequity Group Ltd	IDQ	Financials
Standard Bank Group Ltd	SBK	Financials
Peregrine Holdings Ltd	PGR	Financials
Santam Ltd	SNT	Financials
Fountainhead Property Trust	FPT	Financials
SA Corporate Real Estate Ltd	SAC	Financials
Investec plc	INP	Financials
Brait SE	BAT	Financials
Barclays Africa Group Ltd	BGA	Financials
Nutritional Holdings Ltd	NUT	Health Care
AfroCentric Investment Corporation Ltd	ACT	Health Care
Aspen Pharmacare Holdings Ltd	APN	Health Care
Micromega Holdings Ltd	MMG	Industrials
Torre Industries Ltd	TOR	Industrials
Allied Electronics Corporation Ltd	AEL	Industrials
Mpact Ltd	MPT	Industrials
ARB Holdings Ltd	ARH	Industrials
Ellies Holdings Ltd	ELI	Industrials
Hudaco Industries Ltd	HDC	Industrials
PSV Holdings Ltd	PSV	Industrials
Murray and Roberts Holdings Ltd	MUR	Industrials
Aveng Group Ltd	AEG	Industrials
Value Group Ltd	VLE	Industrials
Iliad Africa Ltd	ILA	Industrials
Primeserv Group Ltd	PMV	Industrials
Reunert Ltd	RLO	Industrials
Astrapak Ltd	APK	Industrials

COMPANY	JSE CODE	JSE INDUSTRY
Howden Africa Holdings Ltd	HWN	Industrials
Argent Industrial Ltd	ART	Industrials
Wilson Bayly Holmes-Ovcon Ltd	WBO	Industrials
Transpaco Ltd	TPC	Industrials
Sacoil Holdings Ltd	SCL	Oil & Gas
Silverbridge Holdings Ltd	SVB	Technology
Datacentrix Holdings Ltd	DCT	Technology
EOH Holdings Ltd	EOH	Technology
Datatec Ltd	DTC	Technology
Telkom SA Ltd	TKG	Telecommunications
MTN Group Ltd	MTN	Telecommunications
IPSA Group plc	IPS	Utilities

ANNEXURE B:

EXPLANATORY LITERATURE REVIEW – MEASUREMENT INSTRUMENTS

Table B1: A summary of determinant and effect studies that have measured corporate website disclosures

(see notes end table)

	Study	Country	Sample selection criteria	Atr.	P	C	Max	Avg.	W	Q	R	V
1	Ettredge *et al*. (1999)	US	AIMR rated	15	1	14			No	No	No	No
2	Pirchegger and Wagenhofer (1999)	Multi (2)[221]	Largest in each country	51	30	21	95%	65%	Yes	No*	No	No
3	Ettredge *et al*. (2001)	US	AIMR rated	17	3	14	88%	33%	No	No	No	Yes
4	Ettredge *et al*. (2002)	US	AIMR rated	16	1	15		37%	No	No	No	No
5	Lybaert (2002)	Netherlands	AEX[222] listed	43	21	22	83%	54%	Yes	No	No	No
6	Larrán and Giner (2002)	Spain	MSE[223] listed	26	4	22			Yes	No*	No	No
7	Bonsón and Escobar (2002)	Multi (15)[224]	Largest in each country	23	1	22	91%	48%	No*	No	No	No
8	Allam and Lymer (2003)	Multi (5)[225]	Largest in each country	36	4	32	86%	64%	No	No*	No	No
9	Geerings *et al*. (2003)	Multi (3)[226]	Largest in each country	29	9	20		56%[227]	No	No	No	No
10	Froidevaux (2004)	US	Smallest and largest listed	102	4	98	55%	27%	No*	No*	No	Yes

[221] Austria and Germany
[222] Amsterdam Stock Exchange (ASX)
[223] Madrid Stock Exchange (MSE)
[224] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden and UK
[225] US; UK; Canada; Australia and Hong Kong
[226] Belgium, France and Netherlands
[227] Belgium (48%), France (59%) and Netherlands (61%)

	Study	Country	Sample selection criteria	Atr.	P	C	Max	Avg.	W	Q	R	V
11	Marston and Polei (2004)	Germany	Smallest & largest DAX[228] listed	71	25	46	86%	68%	Yes	Yes	No	No
12	Xiao *et al*. (2004)	China	Largest listed on Shanghai or Shenzhen	82	22	60	60%	31%	No*	No	No	No
13	Celik *et al*. (2006)	Turkey	ISE[229] listed	162	24	138	39%	9%	No*	No	No	No
14	Bollen *et al*. (2006)	Multi (6)[230]	Largest in each country	29	9	20	86%	59%	Yes	Yes	No	No
15	Pervan (2006)	Multi (2)[231]	Actively traded listed	30	5	25	97%	23%[232]	No*	No	No	No
16	Bonsón and Escobar (2006)	Multi(13)[233]	Random sample	44	5	39	73%	20%	No*	No	No	No
17	Serrano-Cinca *et al.* (2007)	Spain	Financial sector	26	7	19			No	No*	Yes	Yes
18	Abdelsalam *et al*. (2007)	UK	Stratified size (largest 25%)	143			86%	66%	No	Yes	No	No
19	Aerts *et al*. (2007)	Multi (5)[234]	Largest non-financials	101	0	101		26%[235]	Yes	Yes	Yes	No
20	Kelton and Yang (2008)	US	NASDAQ[236] listed	36	10	26	86%	55%	No	No	Yes	No
21	Trabelsi *et al*. (2008)	Canada	Random sample	79	0	79			No*	Yes	Yes	Yes

[228] *Deutscher Aktienindex* (German stock index)
[229] Istanbul Stock Exchange (ISE)
[230] South Africa, Australia, Belgium, France, Netherlands and UK
[231] Croatian and Slovene
[232] Slovene listed companies average is 59% compared to 23% average reported for Croatian listed companies
[233] Eastern European countries: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia and Turkey.
[234] Germany, France, Benelux, Canada and US
[235] Calculated as the average of Europe (German, France and Benelux) (20%) and North America (Canada and US) (32%)
[236] National Association of Securities Dealers Automated Quotations (NASDAQ)

	Study	Country	Sample selection criteria	Atr.	P	C	Max	Avg.	W	Q	R	V
22	Abdelsalam and El-Masry (2008)	Ireland	ISE[237] listed	13	6	7	75%	46%	No	No	No	No
23	Chang *et al*. (2008)	Australia	S&P/ASX listed	44	3	41	90%	49%	Yes	Yes	No	Yes
24	Cormier *et al*. (2009)	Canada	Largest non-financials	111	8	103	58%	25%	Yes	Yes	Yes	No
25	Aly *et al*. (2010)	Egypt	Largest actively traded listed	90	31	59			No*	No	No	No
26	Orens *et al*. (2010)	Multi (6)	Largest in each country	88	0	88		27%	Yes	Yes	Yes	Yes
27	Lai *et al*. (2010)	Taiwan	TSE[238] listed	32	4	28	50%	31%	Yes	No*	No	No
28	Sánchez *et al*. (2011)	Spain	Non-financials MSE[239] listed	8	0	8	88%	26%	No*	No	No	No

Atr = number of attributes measured; **P** = number of presentation related attributes; **C** = number of content related attributes

Max = maximum disclosure score in study; **Avg** = average disclosure score in study

W = use of weights in study (either individual attributes or categories), where *Yes* indicate the use of weights; No* indicate that weights were not used, but reasons therefore motivated in study and *No* indicate that weights were neither used or discussed

Q = quality versus quantity in study, where *Yes* indicate an attempt to measure quality; *No** indicate that quality were not measured, but referred to / discussed in the study and *No* indicate no discussion to quality versus quantity in the study

R = Reliability tests, where *Yes* indicate that a reliability test is discussed in the study and *No* indicate no reference thereto

V = Validity tests, where *Yes* indicate that a validity test is discussed in the study and *No* indicate no reference thereto

[237] Irish Stock Exchange (ISE)
[238] Taiwan Stock Exchange (TSE)
[239] Madrid Stock Exchange (MSE)

Table B2: A list of descriptive studies that have measured corporate website disclosures

	Study	Country
1	Lymer *et al.* (1999)	22 countries[240]
2	Deller *et al.* (1999)	Three countries[241]
3	Hedlin (1999)	Sweden
4	FASB (2000)	US
5	Brennan and Kelley (2000)	Ireland
6	Venter (2002)	South Africa
7	Fisher *et al.* (2002)	New Zealand
8	Loxton (2003)	South Africa
9	Lodhia *et al.* (2004)	Australia
10	Barac (2004)	South Africa
11	Davey and Homkajohn (2004)	Thailand
12	Matherly and Burton (2005)	US
13	Khadaroo (2005a)	Malaysia
14	Hamid (2005)	Malaysia
15	Khadaroo (2005b)	Malaysia and Singapore
16	Khan (2006)	30 countries
17	Spanos (2006)	Greece
18	Khan (2007)	30 countries
19	Mohammed *et al.* (2009)	Oman
20	Ali (2010)	New Zealand
21	Baard and Nel (2011)	Multi

[240] South Africa and 21 other countries
[241] US, UK and Germany

ANNEXURE C: MEASUREMENT CONVENTIONS

1. GENERAL

The main purpose of this annexure is to describe how the measurement instrument was applied in this study in order to enable other researchers to use it, as is, or to use it as a benchmark in the development of their own instruments. Two issues are important: first, how each attribute measured in this dissertation is scored (e.g. 0, 0.5 or 1) and, second, which sections of corporate web homepages are surveyed, and if any documents or document types are *not* examined.

Each of the 11 categories used to categorise the 346 attributes measured are discussed separately and in the following sequence: brief reference to the Investor Relations Society (IRS) best practice guidelines and the number of attributes as per Annexure D; reference or brief discussion of the website sections and documents examined/not examined; and finally a discussion of the scoring of the attributes. As the majority of attributes were measured using the same measurement rules and given the impracticality of repeating information for 346 attributes, only specific exceptions as discussed below in Section 1.1 and 1.2 were discussed per category.

1.1 Website sections and document types examined/not examined

1.1.1 Website sections

Most attributes were measured through an examination of the entire website. In some cases, however, only one or a combination of the following sections was examined: homepage, investor relations section, financial results section, and news section. In a few cases, reference to external links were also examined.

1.2.2 Document types

The majority of attributes were measured through an examination of only HTML sections and dedicated and descriptive PDF documents. As a general rule, the detailed content of PDF annual and interim reports (including related reports, e.g. sustainability and corporate governance reports), presentations, manuals and policies, and fact sheets were not examined.

1.2 Scoring of attributes

Most of the 346 attributes listed in Annexure D were measured as either available (1) or absent (0), with two exceptions as discussed below.

1.2.1 Partially available attributes

The first exception is the 50 attributes that were specifically measured from the outset as either available (1), partially available (0.5) or absent (0). As the measurement of these attributes were in general more complicated and may have involved some subjectivity, they are discussed in detail, with applicable examples for further illustration, in this annexure.

1.2.2 Outdated and not fully usable attributes

The second exception relates to attributes that were available, but outdated (i.e. not timely), or links that were unusable (e.g. the link was not functional or no link was available) or the usability of the attribute was negatively impacted (e.g. by incomplete information, or by the availability of two links for the same attribute where one was not functional, or by extremely poor layout of information).

Some outdated information was still relevant and therefore 0.5 was awarded, but other information was deemed unusable given either the specific nature of the information (forward-looking information) or simply the fact of being too outdated (e.g. history last updated in 1999).

Although the dissertation admits to the subjective nature of using such a methodology, it was deemed necessary to ensure that disclosure scores would differentiate between quantity and quality.

2. ACCESSIBILITY

The accessibility category combines three related Investor Relations Society (IRS) best practice consideration categories: awareness, usability and accessibility. According to these best practice guidelines, a best practice website should be available to the widest possible audience and should be fully accessible to allow equal access to all users, including those with visual, hearing, cognitive and motor impairments.

Table D1, Annexure D, lists the 13 attributes that were used to measure this construct.

2.1 Website sections and document types examined/not examined

For all accessibility-related attributes the entire website was examined and no document types were excluded, except for the 'user-friendliness of homepage[242]' attribute, where only the homepage was examined.

2.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all accessibility-related attributes were measured as either available (1) or absent (0), except for

[242] The landing page or first page that a visitor to a corporate website will see.

the three attributes discussed below (Section 2.2.1 to 2.2.3) that were measured as either available (1), partially available (0.5), or absent (0).

2.2.1 User-friendliness of the homepage

Homepages that are not user-friendly will also decrease the usability of the corporate website as information source and may decrease the accessibility thereof for specific users. To measure the user-friendliness of the homepage, a default score of 1 was given if the company had a working website. For both homepages where excessive scroll down was necessary to access all homepage information and homepages that were characterised by the excessive use of graphics, 0.5 was deducted from the default score of 1.[243]

The excessive use of graphics was measured with four sub-attributes: use of large icons on homepage, use of large static graphics on homepage, use of moving graphics on homepage, and use of rolling script on homepage. If either large icons or large static graphics were used on the homepage, as well as moving graphics and moving script, the homepage was classified as using excessive graphics.

2.2.2 Disclaimers (terms of use and/or privacy policy)

Disclaimers that describe the terms of use of websites (e.g. privacy policy) improve the usability of corporate websites by setting the boundaries within which users should use the websites and provide assurance that privacy will be protected. A score of 1 was awarded for the availability of such a disclaimer on the homepage, but if users were required to accept specific terms or conditions (e.g. having to click on “I agree”) before they could gain access to the disclaimer or the disclaimer specifically excluded specific jurisdictions from using the website, 0.5 was deducted.

2.2.3 Multiple languages

Information that is available in multiple languages (i.e. additional languages to English) can potentially improve the usability and accessibility of information (e.g. financial results, presentations, media interviews and articles). A maximum score of 1 was awarded for the use of multiple languages, as follows: current information is available in Afrikaans (0.5), archive information is available in Afrikaans (0.5), and current information is available in any other additional language (1). Archived Afrikaans information was awarded 0.5 to recognise the historical practice of some JSE-listed companies to publish Afrikaans and English annual reports. If specific information was, however, only available in Afrikaans (e.g. media

[243] For only two companies in the study sample, 0.5 was deducted for both excessive scroll down and the excessive use of homepage graphics (i.e. 0 was awarded for this attribute).

interviews), the dissertation argued that as the accessibility of the information would decrease for non-Afrikaans-speaking users, 0.5 should be deducted.

3. NAVIGATION

According to the IRS best practice guidelines, a best practice website should be easy to navigate and its use should be intuitive. Table D1, Annexure D, lists the 14 attributes that were used to measure this construct.

3.1 Website sections and document types examined/not examined

For the search function, sitemap, frequently asked questions (FAQ) and help function, only the homepage or dedicated investor relations section (if available) were examined. For the cookie policy, the homepage and all disclaimers (including privacy policy, terms and conditions, and 'legal') were examined.

For the 'convenience – read more' and 'drill down' attributes only internal links to HTML sections were counted. PDF and other downloads were not counted as an internal link.

3.2 Scoring of attributes

Besides the usability and timeliness issues, as discussed in Section 1.2.2 above, all navigation-related attributes were measured as either available (1) or absent (0), except for the two attributes discussed below (Sections 3.2.1 and 3.2.2) that were measured as either available (1), partially available (0.5) or absent (0).

3.2.1 Effectiveness of the search function

Where a search function was provided on the website, the effectiveness thereof was tested by searching for news about the chairman, or, if this was not found, for news about another director or for annual results/report (both annual results and annual report were searched for). If useful and timely information was found within the first five search results, the search function was deemed effective, with 0.5 awarded for each (i.e. only 1 was awarded if useful and timely information for both were found within the first five search results).

3.2.2 Cookie policy

According to Microsoft[244] a cookie is a small text file that is stored on the user's hard drive by a web page server and will personalise webpages based on browsing history. Cookies allow the website owner (i.e. company) to be efficient in for instance learning which pages are important for visitors and which not.

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[244] Source: www.microsoft.com/info/cookies.mspx

If a company explains its use of cookies on the homepage, a score of 1 is awarded. Some companies, however, only explain the use thereof in a company disclaimer[245], in which case only 0.5 was awarded, as it would be more likely for the user to overlook the information in such cases than when provided with a separate link on the homepage.

4. TIMELINESS

According to the IRS best practice guidelines, information should be available simultaneously to everyone, ensuring equal access. Table D1, Annexure D, lists the 12 attributes that were used to measure this construct.

4.1 Website sections and document types examined/not examined

For the 'latest update' attribute, only HTML formats were considered, i.e. PDF and other downloads were not examined.

For the copyright attribute and the five timeliness indicators (SENS[246], news, results, share price, 'any other') only the homepages were examined. SENS and news published on the homepage were assessed to be the latest, if clearly labelled 'latest' or dated (and not older than three months).

For the e-mail alert and RSS[247] content feed attributes, the homepage and, if available, the investor-relations and news sections were examined.

4.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all timeliness-related attributes were measured as either available (1) or absent (0), except for the one attribute discussed in Section 4.2.1, which was measured as either available (1), partially available (0.5), or absent (0).

4.2.1 Timeliness indicators – latest share price

As listed in Annexure D, a number of attributes were measured as indicators of a timely website. One of these attributes was the share price. If the company clearly indicated that it had given the latest share price or if it was clear that the latest share price had been displayed (i.e. it was dated), 1 was awarded. Otherwise, 0.5 was awarded.

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[245] Some companies have only one general disclaimer, others have separate links, for example disclaimer, privacy policy, terms and conditions and legal.
[246] Stock exchange news service
[247] Rich site summary or really simple syndication.

5. COMPANY INFORMATION

According to the IRS best practice guidelines, telling the company story is one of the main functions of the corporate website. Table D1, Annexure D, lists the 36 attributes that were used to measure this construct. These attributes were categorised into 10 sub-categories: dedicated 'about us link', history, contact details, organisational chart and group structure, vison and mission, customer information, product and services, suppliers, properties, and critical success factors.

5.1 Website sections and document types examined/not examined

Only contact information provided on the homepage or via a dedicated homepage link was measured[248]. For all 'company information' attributes this study examined only HTML and dedicated and descriptive downloads (e.g. PDF with title "group structure") and therefore ignored all annual and interim reports, presentations and fact sheets.

For attributes related to customer information, products and services, suppliers and properties, this study also examined external links which were given (e.g. "for more information about products see www.companyb.co.za") as well as HTML and descriptive PDF downloads. External links to which the user was not specifically referred to for information were not examined.

5.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all company information-related attributes were measured as either available (1) or absent (0), except for the one attribute discussed in Section 5.2.1, which was measured as either available (1), partially available (0.5), or absent (0).

5.2.1 Geographical presence

If companies published a map(s) to indicate areas in which they do business, a score of 1 was awarded. A score of 0.5 was, however, awarded for companies that had published only a list of geographical areas.

6. FINANCIAL INFORMATION

According to the IRS best practice guidelines, one of the main reasons that investors visit corporate websites is to access reliable and up-to-date financial information. Table D1, Annexure D, lists the 65 attributes that were used to measure this construct. These attributes

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[248] Contact information provided under the Investor Relations section was measured under shareholder information as per Section 9 in this annexure.

were categorised into four sub-categories: financial reports, presentations, financial analysis, and archives.

6.1 Website sections and document types examined/not examined

To assess the presence or absence of financial highlights/summaries, ratios and key performance indicators, only the following documents were examined: HTML content, dedicated and descriptive downloads (e.g. “for financial ratios, click here”), and company fact sheets. The content of annual (including provisional, preliminary and abridged), interim and quarterly reports, as well as all presentations, were therefore not examined, unless a dedicated link to the information was provided.

6.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all financial information-related attributes were measured as either available (1) or absent (0), except for the three attributes discussed below (Section 6.2.1 to 6.2.3) that were measured as either available (1), partially available (0.5) or absent (0).

To measure the completeness of archived information, the listing age of companies was also considered. Four attributes were used to measure the availability of all archived annual and interim results. For each attribute two criteria were used. If any one of the two criteria were present, the attribute was assessed as present. These two criteria were: the percentage of archived reports available over the number of qualifying years, and a substantial number of years. Qualifying years were calculated as the number of years listed minus 2.[249] The substantial number of years were used as alternative criteria to accommodate companies that had been listed for longer periods.

For example, for annual report archives, the first attribute measured whether archived reports (annual financial statements or integrated annual report) were available for at least 25% of qualifying years listed or three years. The three years were used as a substantial number of years for companies listed for longer periods, e.g. if a company were listed for 80 years and provided archived results for only 12 years, the attribute would be deemed present although archived results were available for less than 25% of years.

[249] Two years were used based on the assumption that newly listed companies will not publish annual reports within their first two years. It is acknowledged that a company’s age as measured from registration date may be older than the listing age and that archived reports may be available for the years between registration date and listing date.

To measure archived presentations, the number of years listed were also considered and adjustments were made for companies listed for fewer than five[250] years (result presentations) and four[251] years (investor presentations).

6.2.1 Ability to manipulate report downloads

Given the scope of annual reports, some users may be more interested or only interested in specific sections of the annual reports. If users had the option to create their own report by, for example, the use of tick boxes, a score of 1 was awarded. For the option of separate PDF downloads only, a score of 0.5 was awarded. The advantage of the former is that only one PDF report is created that can be downloaded, as opposed to per-section downloads where various files would have to be downloaded.

6.2.2 Archive result presentations (slides)

If both annual and interim result presentation slides were available for a specific archive year, a score of 1 was awarded. If however slides were only available for the annual or interim presentations, 0.5 was awarded.

6.2.3 Archive investor presentations (slides)

For companies that provide two or more investor presentations (excluding result presentations), a score of 1 was awarded. If only one investor presentation was provided, a score of 0.5 was awarded.

7. RELEVANT NEWS

According to the IRS best practice guidelines, a key element of a good corporate website is keeping investors up to date with news about the company, its strategy and operating environment. Table D1, Annexure D, lists the 23 attributes that were used to measure this construct. These attributes were categorised into three sub-categories: SENS[252]), media(press) releases made by the company and news published by the financial media.

7.1 Website sections and document types examined/not examined

To assess the availability of social media channels (e.g. Twitter and Facebook) only the following sections of the corporate website were examined: homepage and, if available,

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[250] Presentations were based on results and on the methodology used to measure archived annual and interim results. The five years were calculated as the three years for which archived presentations were measured plus two years.
[251] The four years were calculated as the three years for which archived presentations were measured plus one year. These presentations exclude result presentations and the two-year exemption used for result presentations were therefore relaxed to one year.
[252] Stock Exchange News Service.

investor relations, contact and news sections. The respective social media channels were therefore not directly examined to assess whether each is used or not used by the company.

7.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all news-related attributes were measured as either available (1) or absent (0), except for the two attributes discussed below (Sections 7.2.1 and 7.2.2) that were measured as either available (1), partially available (0.5) or absent (0).

7.2.1 News (excluding SENS): dedicated and descriptive link

News links provided on the homepage are more visible and therefore more accessible to users. Links available via the homepage were therefore assessed as available (1) and links available only via the investor relations or 'about us' sections as partially available (0.5).

7.2.2 SENS: dedicated and descriptive link

As with 7.2.1 above, links via the homepage were assessed as available (1) and links available only via investor relations, 'about us' or news (unless indicated as SENS) were assessed as partially available (0.5).

8. INVESTMENT CASE

According to the IRS best practice guidelines, the corporate website should provide users with a clear statement of strategy and vision. Table D1, Annexure D, lists the 26 attributes that were used to measure this construct. These attributes were categorised into four sub-categories: investment pack, forecasts, industry, and corporate profile.

8.1 Website sections and document types examined/not examined

For all attributes measured in the investment case category only the following website sections were examined: HTML content, dedicated and descriptive downloads, corporate fact sheet and investor pack. The contents of the following were therefore not examined to assess investment case attributes: annual and interim reports, presentations and news items.

8.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all investment case-related attributes were measured as either available (1) or absent (0).

9. SHAREHOLDER INFORMATION

According to the IRS best practice guidelines, the corporate website should provide an up-to-date source of shareholder information. Table D1, Annexure D, lists the 60 attributes that were used to measure this construct. These attributes were categorised into 13 sub-categories:

dedicated investor relations section, investor contact details, shareholder communications, PAIA,[253] company advisors, analysts, share price information, dividend information, shareholder information, shareholder meetings, financial calendar, listing information, and other shareholder services/information.

9.1 Website sections and document types examined/not examined

To assess whether the company provided a dedicated investor relations link only the homepage was examined. The followed link titles were assessed in this study as a dedicated investor relations link: investor relations, investor centre, investors, investors and media, investor information, investor relations and media, investor profile, stakeholder relations, and shareholder relations.

Corporate fact sheets, investor packs, annual and interim reports, circulars and presentations, SENS and press releases were not examined (except as discussed below).

For listing information, only annual and interim reports, circulars and presentations were specifically excluded, with corporate fact sheets and investor packs, as well as HTML and dedicated and descriptive downloadable documents examined.

For share price information, only the homepage or investor relation section (if available) was examined, except for market capitalisation where corporate fact sheets and investor packs were also examined.

9.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all shareholder information-related attributes were measured as either available (1) or absent (0), except for the six attributes discussed below (Section 9.2.1 to 9.2.6) that were measured as either available (1), partially available (0.5) or absent (0).

9.2.1 Investor relations contact details: e-mail available

A personalised e-mail address (e.g. JohnDoe@hunter.co.za) was assessed as available (1), compared to a general e-mail address (e.g. Investor@hunter.co.za) that was assessed as only partially available (0.5).

9.2.2 Analyst contact details

If contact details were provided for some analysts, but not all, the attribute was assessed as only partially available (0.5).

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[253] Public Access to Information Act.

9.2.3 Latest analyst report or presentation: opinion

Analyst reports that include only a general discussion without a clear opinion (i.e. buy, sell or hold), were assessed as only partially available (0.5).

9.2.4 Annual General Meeting (AGM): outcome

Minutes, transcripts or a detailed list of the voting results and decisions were assessed as available (1), compared to only brief summaries (e.g. “all resolutions were passed”) which were assessed as only partially available (0.5).

9.2.5 Annual General Meeting (AGM): notice

A complete downloadable notice of the next or most recent AGM was assessed as available (1), compared to only a summary or only the proxy thereof, which were assessed as only partially available (0.5).

9.2.6 Shareholder relations policy

A mere reference to the existence of a shareholder relations policy was assessed as only partially available (0.5), and only complete downloadable policies were assessed as available (1).

10. BONDHOLDER INFORMATION

According to the IRS best practice guidelines, companies should provide clear information about their corporate debt situation, as applicable. Table D1, Annexure D, lists the five attributes that were used to measure this construct.

10.1 Website sections and document types examined/not examined

For this category, only HTML content, descriptive and downloadable documents, corporate fact sheets and investor packs were examined. Annual and interim reports and presentations were specifically excluded.

10.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all bondholder-related attributes were measured as either available (1) or absent (0).

11. CORPORATE GOVERNANCE

According to the IRS best practice guidelines, it is no longer sufficient for companies simply to refer corporate website users to relevant parts of the annual report for corporate governance information. Table D1, Annexure D, lists the 50 attributes that were used to measure this construct. These attributes were categorised into 11 sub-categories: dedicated corporate governance link, corporate governance report, King III, directors, executives and

management, board committees, management committees, code of conduct, memorandum of incorporation, insider trading policy, and whistle blowing policy.

11.1 Website sections and document types examined/not examined

Annual and interim reports, corporate governance reports or policy documents, presentations, press releases, SENS and the code of conduct were not examined, unless a dedicated and descriptive link was provided.

To assess the availability of insider trading and whistle blowing polices, the code of conduct/ code of ethics (if available) was, however, assessed.

11.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all corporate governance-related attributes were measured as either available (1) or absent (0), except for the 19 attributes discussed below (Section 11.2.1 to 11.2.19) that were measured as either available (1), partially available (0.5) or absent (0).

11.2.1 Dedicated corporate governance link

Dedicated homepage links (e.g. the corporate governance link on the homepage) are more accessible compared to sub-links (e.g. corporate governance link available as a sub-link for a homepage link such as ‘about us’ or investor relations). Dedicated homepage links were therefore assessed as available (1), and sub-links as partially available (0.5).

11.2.2 King III

As King III compliance is only applicable to companies with a primary listing on the JSE, King III equivalents (e.g. Corporate Governance Code, UK, or Sarbanes-Oxley, US) were included in the assessment and the attribute ‘King III’ therefore also includes these equivalents, as applicable. Mere references to King III compliance were assessed as partially available (0.5). Only complete King III schedules were therefore assessed as being available (1).

11.2.3 Directors’ qualifications

Companies that provided qualifications for at least one director, but not for all directors, were assessed as only partially available (0.5).

11.2.4 Directors’ experience

Companies that provided a brief discussion of directors’ experience for at least one director, but not for all directors, were assessed as only partially available (0.5).

11.2.5 Directors' date appointed to the board

Companies that provided the date of appointment or the number of years of service as a director for at least one director, but not for all directors, were assessed as only partially available (0.5).

11.2.6 Directors' ownership

Ownership that was discussed only in qualitative terms (e.g. director A is a substantial shareholder) was assessed as only partially available (0.5), as opposed to ownership discussed in quantitative terms (e.g. director A has a 20% interest), which was assessed as being available (1).

11.2.7 Board membership policies

Any reference or brief discussion of a board membership policy was assessed as only partially available (0.5), as opposed to the provision of a detailed policy describing, for instance, the procedures for the appointment of new directors and maximum periods that directors may serve, which was assessed as being available (1).

11.2.8 Responsibilities of the board

References or brief summaries of board responsibilities were assessed as only partially available (0.5), compared to detailed policies, which were assessed as available (1).

11.2.9 Executive and management – qualifications

As for directors, refer to 11.2.3 above.

11.2.10 Executive and management – experience

As for directors, refer to 11.2.4 above.

11.2.11 Executive and management – date appointed

As for directors, refer to 11.2.5 above.

11.2.12 Board committee charters or terms of reference

Companies that provide only summary charters or terms of reference, but provide these summaries for at least 75% of board committees (as listed by the company) were assessed as being partially available (0.5). To be assessed as available, this study required complete charters for at least 75% of board committees (as listed by the company).

11.2.13 Board committee – members

If only a broad policy (e.g. "risk committee will always consist of at least two non-executive directors") was available for at least 75% of board committees (as listed by the company), it

was assessed as being only partially available (0.5). Companies that provided a list of committee members for at least 75% of board committees (as listed by the company) were assessed as available (1).

11.2.14 Management committee charter or terms of reference

As for directors, refer to 11.2.12 above.

11.2.15 Management committee – members

As for directors, refer to 11.2.13 above.

11.2.16 Remuneration policy

Summaries of remuneration policies were assessed as partially available (0.5), as opposed to complete policies that were assessed as available (1).

11.2.17 Code of conduct

Mere references to code of conduct or brief summaries thereof were assessed as partially available (0.5), as opposed to complete policies, which were assessed as available (1). For the purpose of this study, the code of conduct also included the code of ethics.[254]

11.2.18 Insider trading policy

Mere references to insider trading policy or brief summaries thereof were assessed as partially available (0.5), as opposed to complete policies, which were assessed as available (1).

11.2.19 Whistle blowing policy

Mere references to whistle blowing policy or brief summaries thereof were assessed as partially available (0.5), as opposed to complete policies, which were assessed as available (1).

12. CORPORATE RESPONSIBILITY

According to the IRS best practice guidelines, a best practice corporate website should contain comprehensive information about the company's sustainability policies and data, including a detailed review of how policies are linked to environmental and social management. Table D1, Annexure D, lists the 42 attributes that were used to measure this construct. These attributes were categorised into seven sub-categories: dedicated corporate responsibility link, reports, policies, BBBEE, employees, corporate citizenship, and stakeholders.

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[254] Although slightly different in that the code of ethics are generally wide-ranging and non-specific as compared to the code of conduct that generally outlines specific behaviours that are required, both attempt to encourage specific forms of behaviour by employees. Companies often combine these two codes in a single document (source: http://smallbusiness.chron.com)

12.1 Website sections and document types examined/not examined

Annual and interim reports, corporate responsibility reports (including social and sustainability reports), presentations and press releases were not examined, unless a dedicated and descriptive link was provided.

12.2 Scoring of attributes

Besides the usability and timeliness issues as discussed in Section 1.2.2 above, all corporate responsibility-related attributes were measured as either available (1) or absent (0), except for the 13 attributes discussed below (Section 12.2.1 to 12.2.13) that were measured as either available (1), partially available (0.5) or absent (0).

12.2.1 Dedicated corporate responsibility link

Dedicated homepage links (e.g. corporate responsibility link on homepage) are more accessible compared to sub-links (e.g. corporate responsibility link available as a sub-link for a homepage link, such as ‘about us’ or investor relations). Dedicated homepage links were therefore assessed as available (1) and sub-links as partially available (0.5).

12.2.2 Progress – environmental issues

Summaries of qualitative discussions of progress relating to environmental issues were assessed as only partially available (0.5), compared to quantitative discussions of progress, which were assessed as available (1).

12.2.3 JSE Socially Responsible Investment Index

Mere references to companies’ inclusion in the JSE Socially Responsible Investment (SRI) Index were assessed as partially available (0.5), as opposed to the provision of an SRI certificate, which was assessed as available (1).

12.2.4 Global Reporting Initiative

References to or statements of compliance were assessed as partially available (0.5). Only complete Global Reporting Initiative (GRI) reports were assessed as being available (1).

12.2.5 United Nations Global Compact principles

As with GRI above, references to or statements of compliance with the United Nations Global Compact (UNGC) principles were assessed as partially available (0.5), and reports were assessed as available (1).

12.2.6 International Organization for Standardization

Mere references to compliance with the International Organization for Standardization (ISO) were assessed as only partially available (0.5), as opposed to ISO certificates that were assessed as available (1).

12.2.7 Environmental policies

Summaries of environmental policies were assessed as partially available (0.5), and complete downloadable policies were assessed as available (1).

12.2.8 Environmental objectives

Mere summaries of or references to environmental objectives were assessed as partially available (0.5), as opposed to more detailed and quantitative discussions, which were assessed as available (1).

12.2.9 Health and safety policies

Summaries of health and safety policies were assessed as partially available (0.5), and complete downloadable policies as available (1).

12.2.10 Supplier Code of Conduct

Mere references to supplier codes of conduct or brief summaries thereof were assessed as partially available (0.5), as opposed to complete policies that were assessed as available (1).

12.2.11 Broad-based Black Economic Empowerment (BBBEE)

Mere references to BBBEE compliance (i.e. status) were assessed as only partially available (0.5), as opposed to BBBEE certificates that were assessed as available (1).

12.2.12 Workplace policy

Summaries of workplace policies were assessed as partially available (0.5), as opposed to complete downloadable policies that were assessed as available (1).

12.2.13 Stakeholders

Mere stakeholder lists, with or without brief descriptions or discussions, were assessed as partially available (0.5), as opposed to detailed stakeholder engagement plans or strategies that were assessed as available (1).

ANNEXURE D:

MEASUREMENT INSTRUMENT

Table D1: List of attributes measured, organised per category

	Category	Attribute
1	Accessibility	Dual functionality – both .co.za and .com URL extensions are functional
2	Accessibility	Unique URL
3	Accessibility	User-friendliness of the homepage
4	Accessibility	Interactive/dynamic/e-reader/web version (excluding similar items separately measured)
5	Accessibility	Excel downloads (excluding similar items separately measured)
6	Accessibility	Presentations – Webcasts/Podcasts/Transcript (excluding similar items separately measured)
7	Accessibility	Print this page function
8	Accessibility	Disclaimer – terms use and/or privacy policy
9	Accessibility	Disclaimer – media/forward-looking information
10	Accessibility	Multiple languages
11	Accessibility	Option tailor content (e.g. font size) to improve accessibility for a specific disability
12	Accessibility	Support for users mobile / other devices
13	Accessibility	Recommend this page function
14	Navigation	Search function
15	Navigation	Effectiveness of the search function
16	Navigation	Either FAQ or Help function is organised in categories
17	Navigation	Either FAQ or Help function has useful information for investors
18	Navigation	Sitemap
19	Navigation	Position on website clearly visible
20	Navigation	Cookie policy
21	Navigation	Convenience – ‘read more’ links
22	Navigation	Drill down links
23	Navigation	Convenience – between sections links
24	Navigation	External links – warning flag (e.g. “you are now leaving the company’s website”)
25	Navigation	Use of external links to provide more information (e.g. subsidiaries / segments / parent)
26	Navigation	Homepage link clearly visible on all pages
27	Navigation	Ability to manipulate information (excluding items separately measured)
28	Timeliness	Last update – Homepage

	Category	Attribute
29	Timeliness	Copyright date at bottom of page
30	Timeliness	Copyright date – 2014 or 2015
31	Timeliness	Timeliness indicators – latest SENS
32	Timeliness	Timeliness indicators – latest news
33	Timeliness	Timeliness indicators – latest results
34	Timeliness	Timeliness indicators – latest share price
35	Timeliness	Timeliness indicators – any other latest
36	Timeliness	E-mail alert service
37	Timeliness	E-mail alert service – categories available
38	Timeliness	RSS content feed
39	Timeliness	Option synchronise financial calendar with own
40	Company	‘About’ or ‘About us’ homepage link
41	Company	Corporate video / webcasts / podcast
42	Company	Fact sheet / booklet
43	Company	Summary information available via homepage
44	Company	Date founded
45	Company	History
46	Company	History – updated within last two years
47	Company	Contact details – Email
48	Company	Contact details – Telephone number
49	Company	Contact details – Online form
50	Company	Investor relations as contact option
51	Company	Organisational chart / organogram / structure
52	Company	Group structure
53	Company	Operating divisions
54	Company	Dedicated and descriptive link or sub-link to vision/mission/strategy
55	Company	Vision
56	Company	Mission
57	Company	Strategy
58	Company	Strategy – discussed (qualitative)
59	Company	Strategy – discussed (quantitative)
60	Company	Business model
61	Company	Objectives
62	Company	Values
63	Company	Discussion (excluding strategy)
64	Company	Customers – description / profile
65	Company	List major customers

	Category	Attribute
66	Company	Geographical presence
67	Company	List current products / services
68	Company	Description current products / services
69	Company	Downloads current products / services
70	Company	Reference to suppliers / business partners (including list, description, discussion relationship)
71	Company	List major factories, warehouses and properties
72	Company	Description of factories, warehouses and properties
73	Company	Virtual visits/videos to factories, warehouses and properties
74	Company	Photos of factories, warehouses and properties
75	Company	Reference to critical success factors, excluding measurement thereof (see financial information) or strategies for implementation (see investment case)
76	Financial	Annual financial statement (AFS) or integrated annual report (IAR) (PDF)
77	Financial	AFS/IAR: e-Book (or e-Reader)
78	Financial	AFS/IAR: Online mini results site (OMRS)
79	Financial	AFS/IAR: HTML financial statements
80	Financial	AFS/IAR: Financial statements hyperlinked to notes
81	Financial	AFS/IAR: Excel financial statements
82	Financial	AFS/IAR: ability to manipulate report downloads
83	Financial	AFS/IAR: homepage link
84	Financial	Interim results (PDF)
85	Financial	Interim results: alternative format to PDF download
86	Financial	Interim results: homepage link
87	Financial	Any additional financial results to AFS, IAR and Interim results
88	Financial	Auditors report (AR): OMRS link or sub-link
89	Financial	Auditors report (AR) hyperlinked to financial statements or notes
90	Financial	Chairman's Report: OMRS link or sub-link
91	Financial	HTML links to inside IAR or AFS
92	Financial	Annual results presentation: PDF slides
93	Financial	Annual results presentation: webcast
94	Financial	Annual results presentation: podcast
95	Financial	Annual results presentation: transcript
96	Financial	Annual result presentation: homepage link
97	Financial	Annual result presentation: dedicated and descriptive link
98	Financial	Interim results presentation: PDF slides
99	Financial	Interim results presentation: webcast
100	Financial	Interim results presentation: podcast

	Category	Attribute
101	Financial	Interim results presentation: transcript
102	Financial	Interim result presentation: homepage link
103	Financial	Interim results presentation: dedicated and descriptive link
104	Financial	Financial statements: highlights/summaries
105	Financial	Financial statement: highlights/summaries comparison previous years
106	Financial	Financial statement highlights/summaries: dedicated and descriptive link
107	Financial	Share price related ratios
108	Financial	Share price related ratios: dedicated and descriptive link
109	Financial	Financial ratios (excluding share price ratios): at least one ratio
110	Financial	Financial ratios (excluding share price ratios): two or more ratios
111	Financial	Financial ratios (excluding share price ratios): five or more ratios
112	Financial	Financial Ratios (excluding share price ratios): organised categories
113	Financial	Financial Ratios (excluding share price ratios): comparison with previous years
114	Financial	Financial ratios (excluding share price ratios): dedicated and descriptive link
115	Financial	Key performance indicators
116	Financial	Key performance indicators: comparison with previous years
117	Financial	Key performance indicators: dedicated and descriptive link
118	Financial	Archive IAR/AFS: hyperlinked or per annum filter
119	Financial	Archive IAR/AFS: available for at least 25% qualifying years listed or 3 years
120	Financial	Archive IAR/AFS: available for at least 50% qualifying years listed or 6 years
121	Financial	Archive IAR/AFS: available for at least 75% qualifying years listed or 9 years
122	Financial	Archive IAR/AFS: available for all qualifying years listed or 12 years
123	Financial	Archive IAR/AFS: at least one alternative format available for the first archive year
124	Financial	Archive IAR/AFS: at least two alternative formats available for the first archive year
125	Financial	Archive IAR/AFS: three or more alternative formats available for the first archive year
126	Financial	Archive Interim results: available for at least 25% qualifying years listed or 3 years
127	Financial	Archive Interim results: available for at least 50% qualifying years listed or 6 years
128	Financial	Archive Interim results: available for at least 75% qualifying years listed or 9 years
129	Financial	Archive Interim results: available for all qualifying years listed or 12 years
130	Financial	Archive Interim results: at least one alternative format available for the first archive year

	Category	Attribute
131	Financial	Archive Interim results: at least two alternative formats available for the first archive year
132	Financial	Archive result presentations (slides): first archive year
133	Financial	Archive result presentations (slides): second archive year
134	Financial	Archive result presentations (slides): third archive year
135	Financial	Archive investor presentations (slides): 2014
136	Financial	Archive investor presentations (slides): 2013
137	Financial	Archive investor presentations (slides): 2012
138	Financial	Results or investor presentations: at least one alternative format available for the first archive year
139	Financial	Results or investor presentations: at least two alternative formats available for the first archive year
140	Financial	Results or investor presentations: at least three alternative formats available for the first archive year
141	News	News (excluding SENS): dedicated and descriptive link
142	News	News (excluding SENS): pod- or webcasts
143	News	SENS: dedicated and descriptive link
144	News	News (excluding SENS): option to manipulate
145	News	SENS: option to manipulate
146	News	News (excluding SENS): archive
147	News	SENS: current
148	News	SENS: archive
149	News	Archive – categorised per annum – News
150	News	Archive – categorised per annum – SENS
151	News	Press or media releases –printed material
152	News	Press release – 2014: at least one available
153	News	Press release – 2013: at least one available
154	News	In the media – printed material
155	News	In the media – 2014: at least one available
156	News	In the media – 2013: at least one available
157	News	In the media: pod or webcasts
158	News	Contact details for media / public relations department
159	News	Twitter
160	News	YouTube
161	News	LinkedIn
162	News	Facebook
163	News	Other (less popular) social media channels (Google+; Flickr;Pinterest;Blog;Instagram;Foursquare)
164	Investment	Investor pack

	Category	Attribute
165	Investment	Forecasts: dedicated link or sub-link
166	Investment	Future goals/plans
167	Investment	Key risks
168	Investment	Future or recently released new products / projects / services
169	Investment	Production/sales/profit forecasts
170	Investment	Cash flow forecast
171	Investment	Industry forecast
172	Investment	Sector (industry)
173	Investment	Accolades: dedicated link or sub-link
174	Investment	Accolades: at least one available
175	Investment	Accolades: at least two available
176	Investment	Management of quality
177	Investment	Marketing opportunities
178	Investment	Activities/transactions with government/state entities
179	Investment	Strategies & plans for critical success factors
180	Investment	Actions during year
181	Investment	Research and development: discussion
182	Investment	Research and development: spent
183	Investment	Intangible assets: discussion
184	Investment	Investor presentations in the past 12 months – PDF slides: at least one available
185	Investment	Investor presentations in the past 12 months – PDF slides: at least two available
186	Investment	Descriptive link available for current and/or archive investor presentations
187	Investment	Investor presentations in the past 12 months: transcripts
188	Investment	Investor presentations in the past 12 months: pod- or webcasts
189	Investment	Updated financial information
190	Shareholder	Descriptive and dedicated investor relations link on homepage
191	Shareholder	Dedicated link for investor relations contact details
192	Shareholder	Investor relations contact details: e-mail available
193	Shareholder	Investor relations contact details: online form to complete
194	Shareholder	Investor relations contact details: name to contact
195	Shareholder	Investor relations contact details: job title or description
196	Shareholder	Profile of investor relations department
197	Shareholder	Shareholder communications – circulars: dedicated heading/link
198	Shareholder	Shareholder communications – circulars: scattered (i.e. available, but no dedicated link is available)
199	Shareholder	Shareholder communications: PDF newsletters

	Category	Attribute
200	Shareholder	Shareholder communication: Online shareholder administration
201	Shareholder	Access to information manual (PAIA)
202	Shareholder	PAIA act: descriptive title/link
203	Shareholder	Company advisors: dedicated list or link
204	Shareholder	Sponsor or corporate advisor
205	Shareholder	Transfer agent (secretaries)
206	Shareholder	Commercial bankers
207	Shareholder	External auditor
208	Shareholder	List of analysts following the company
209	Shareholder	Analyst contact details
210	Shareholder	Analyst report or presentations by analysts: current
211	Shareholder	Analyst report or presentations by analysts: archive
212	Shareholder	Latest analyst report or presentation: forecast
213	Shareholder	Latest analyst report or presentation: opinion
214	Shareholder	Reference to closed or silent periods
215	Shareholder	Volume traded (shares)
216	Shareholder	Interactive chart (share prices, volume traded)
217	Shareholder	Comparative (e.g. industry or JSE share price movements)
218	Shareholder	Share price history for at least last 12 months
219	Shareholder	Share price calculator
220	Shareholder	Market capitalisation
221	Shareholder	Interactive statistics
222	Shareholder	Capital structure: current
223	Shareholder	Capital structure: recent changes
224	Shareholder	Latest dividend declared / paid
225	Shareholder	Dividend dates (e.g. declared, paid, cum, ex)
226	Shareholder	Dividend history
227	Shareholder	Dividend policy: qualitative information
228	Shareholder	Dividend policy: quantitative information
229	Shareholder	Dividend reinvestment plan
230	Shareholder	Dividend calculator
231	Shareholder	Shareholder analysis
232	Shareholder	Principal shareholders
233	Shareholder	Annual General Meeting (AGM): outcomes
234	Shareholder	AGM: presentations (slides, transcript, web- or podcasts)
235	Shareholder	AGM outcomes: archives
236	Shareholder	Other meetings (excluding AGM): outcomes

	Category	Attribute
237	Shareholder	Online participation meetings
238	Shareholder	AGM: date of next meeting
239	Shareholder	AGM: notice/proxy of next meeting
240	Shareholder	Other meetings (excluding AGM): date of next meeting or notice/proxy
241	Shareholder	Glossary of terms
242	Shareholder	Financial calendar
243	Shareholder	Financial calendar: descriptive link title
244	Shareholder	Name of exchange listed
245	Shareholder	Date listed
246	Shareholder	Exchange / listing information
247	Shareholder	American depository receipts (ADR) program
248	Shareholder	JSE compliance statement or equivalent
249	Shareholder	Shareholder relations policy
250	Bondholder	Dedicated and descriptive link to bondholder information
251	Bondholder	Credit ratings and debt listings
252	Bondholder	Debt presentations
253	Bondholder	Contact details treasury department
254	Bondholder	Information on listed debt instruments
255	Governance	Dedicated corporate governance link
256	Governance	Separate dedicated corporate governance report
257	Governance	At least one archive corporate governance report
258	Governance	Inside link to corporate governance report
259	Governance	Dedicated link to corporate governance manual/policies
260	Governance	King III
261	Governance	Directors: list
262	Governance	Directors: photos
263	Governance	Directors: age
264	Governance	Directors: qualifications
265	Governance	Directors: experience
266	Governance	Directors: date appointed to the board
267	Governance	Directors: committees involved
268	Governance	Directors: type (e.g. Chairman, CEO, CFO, executive, non-executive)
269	Governance	Directors: clear distinction between executives versus non-executives
270	Governance	Company secretary
271	Governance	Directors: compensation
272	Governance	Directors: other directorships
273	Governance	Directors: ownership

	Category	Attribute
274	Governance	Directors: recent share trading
275	Governance	Directors: changes composition board members (board membership policies)
276	Governance	Directors: discussion/list new appointments / retirements to board
277	Governance	Directors: responsibilities of the board
278	Governance	Directors: attendance records board meetings
279	Governance	Directors: minutes board meetings
280	Governance	Executives and management: list
281	Governance	Executives and management: photos
282	Governance	Executives and management: age
283	Governance	Executives and management: qualifications
284	Governance	Executives and management: experience
285	Governance	Executives and management: date appointed
286	Governance	Executives and management: responsibility per executive
287	Governance	Board committees: list
288	Governance	Board committees: board charter (or terms of reference)
289	Governance	Board committees: members
290	Governance	Board committee meetings: attendance records
291	Governance	Board committee meetings: outcomes
292	Governance	Management committees: list
293	Governance	Managements committees: members
294	Governance	Managements committees: charter (or terms of reference)
295	Governance	Remuneration policy
296	Governance	Board performance evaluation policy
297	Governance	Compensation linked performance evaluation
298	Governance	Risk management framework
299	Governance	Code of conduct
300	Governance	Code of conduct: HTML discussion of importance
301	Governance	Memorandum of incorporation (MOI) / Constitution / Articles of association
302	Governance	Insider trading policy
303	Governance	Whistle blowing policy
304	Governance	Relevant contact detail (whistle blowing)
305	Responsibility	Dedicated corporate responsibility link
306	Responsibility	Corporate responsibility report (CRR) / Sustainability report (separate report from IAR / AFS)
307	Responsibility	At least one archive corporate responsibility report (CRR) / sustainability report (SR)
308	Responsibility	Inside link to corporate responsibility report

	Category	Attribute
309	Responsibility	Environmental report
310	Responsibility	Health and safety report
311	Responsibility	Value added statement
312	Responsibility	Carbon report
313	Responsibility	Water usage report
314	Responsibility	Progress - environmental issues
315	Responsibility	Discussion work related accidents
316	Responsibility	JSE SRI (Social Responsibility Index)
317	Responsibility	GRI (Global Reporting Initiative)
318	Responsibility	UNGC (United Nations Global Compact)
319	Responsibility	Reference to compliance any other rules/standards (environment related)
320	Responsibility	International Organization for Standardization (ISO)
321	Responsibility	Environmental policies
322	Responsibility	Environmental objectives
323	Responsibility	Health and safety policies
324	Responsibility	Internal arrangements for implementing environmental and health and safety policies
325	Responsibility	Authority/contacts (i.e. names committee members or dedicated executive responsible for environmental, health and safety issues)
326	Responsibility	Sustainability auditor
327	Responsibility	Supplier code of conduct
328	Responsibility	Broad-Based Black Economic Empowerment (BBBEE)
329	Responsibility	BBBEE structure – Group structure/partners/empowerment transactions/equity program
330	Responsibility	Work place policy
331	Responsibility	Work place related polices
332	Responsibility	Employees: number
333	Responsibility	Employees: average age
334	Responsibility	Employees: breakdown
335	Responsibility	Employees: temporary / permanent
336	Responsibility	Employees: turnover
337	Responsibility	Employees: compensations – qualitative (e.g. policy)
338	Responsibility	Employees: work conditions/development/teamwork
339	Responsibility	Human resource spent (e.g. cost of training)
340	Responsibility	Unions
341	Responsibility	Corporate citizenship: projects involved (i.e. non-commercial community involvement)
342	Responsibility	Corporate citizenship: spent
343	Responsibility	Corporate citizenship: news updates

	Category	Attribute
344	Responsibility	Corporate citizenship: policy or criteria for donations
345	Responsibility	Stakeholders
346	Responsibility	Sustainability web- or podcasts (e.g. interviews with directors on sustainability issues)

ANNEXURE E:

TOP 30 AND BOTTOM 30 ATTRIBUTES

Table E1: Top 30 attributes (highest average availability)

Category	Attribute	Average availability
Company	Annual financial statement or integrated annual report	96%
Company	Company contact details: telephone number	94%
Financial	Archive IAR & AFS available for at least 25% qualifying years listed or 3 years	94%
Financial	Archive Interim results available for at least 25% qualifying years listed or 3 years	92%
Shareholder	Descriptive and dedicated investor relations link on homepage	89%
Financial	Interim results available in PDF format	88%
Navigation	Homepage link clearly visible on all pages	86%
Financial	Archive IAR & AFS available for at least 50% qualifying years listed or 6 years	82%
Governance	Directors: list	82%
Financial	Archive Interim Results available for at least 50% qualifying years listed or 6 years	81%
Governance	Directors: type (e.g. Chairman, CEO, CFO, non-executive, etc.)	81%
Shareholder	Name of stock exchange listed	79%
Accessibility	User-friendly homepage	78%
Company	List of current products/services	76%
News	SENS: current	75%
Accessibility	Unique URL	74%
Governance	Directors: other directorships	73%
Financial	Any additional financial results to AFS, IAR and Interim results	72%
Company	Date founded	67%
News	Dedicated news link (excluding SENS)	67%
Governance	Directors: photos	67%
Navigation	Internal search function	64%
Navigation	Position on website clearly visible	64%
Company	‘About’ or ‘About us’ homepage link	72%
Financial	Archive IAR & AFS available for at least 75% qualifying years listed or 9 years	72%
Navigation	Convenience – ‘read more’ internal hyperlinks	71%
Company	Company contact details: email	71%
Governance	King III	71%
Company	Operating divisions	69%
News	SENS: archive	68%

Table E2: Bottom 30 attributes (lowest average availability)

Category	Attribute	Average availability
Timeliness	Option synchronise financial calendar with own	1%
Financial	Archive IAR & AFS – three or more alternative formats available for the first archive year	1%
Investment	Investor presentations in the past 12 months: transcripts	1%
Shareholder	Profile investor relations department	1%
Shareholder	Online participation meetings	1%
Bondholder	Contact details treasury department	1%
Governance	Directors: recent share trading	1%
Governance	Board meetings: minutes	1%
Navigation	External links – warning flag	2%
Investment	Forecasts – dedicated link or sub-link	2%
Investment	Cash flow forecast	2%
Investment	Strategies & plans for critical success factors	2%
Investment	Actions during year to achieve critical success factors	2%
Investment	Intangibles: discussion	2%
Shareholder	Dividend policy: quantitative information	2%
Shareholder	Dividend reinvestment plan	2%
Bondholder	Debt presentations	2%
Governance	At least one archive corporate governance report	2%
Governance	Separate dedicated corporate governance report	4%
Governance	Compensation linked performance evaluation	4%
Responsibility	Employees: average age	4%
Responsibility	Sustainability web- or podcasts (e.g. interviews with directors on sustainability issues)	4%
Financial	Results or investor presentations: at least three alternative formats available for the first archive year	4%
Governance	Board committee meetings: outcomes	4%
Investment	Research and development - spent	5%
Investment	Investor presentations in the past 12 months: Pod- or Webcasts	5%
Governance	Dedicated link to corporate governance manual/policies	5%
Governance	Directors: discussion/list new appointments / retirements to board	5%
Governance	Board meetings: attendance records	5%
Accessibility	Disclaimer – media/forward looking information	6%